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ABSTRACT

This monograph traces the history and development of the term "information literacy." It examines the economic necessity of being information literate, and explores the research related to the concept. Included are reports on the National Educational Goals (1991) and on the report of the Secretary's Commission on Achieving Necessary Skills (SCANS, 1991). Also examined are recent revisions in national subject matter standards that imply a recognition of the process skills included in information literacy. The book outlines the impact information literacy has on K-12 and higher education, and provides examples of information literacy in various contexts. Appendices include: Information Literacy Standards for Student Learning (prepared by the American Association of School Librarians and the Association for Educational Communications and Technology); definitions of SCANS components; a chronology of the development of information literacy; correlation of information literacy skills with selected National Subject Matter Standards; Dalbotten's Correlation of Inquiry Skills to National Content Standards; and an explanation of rubrics and their application in standards education. Contains an extensive annotated ERIC (Educational Resources Information Center) bibliography and information about ERIC. (Author/AEF)

ED 427 780

Information Literacy

Essential Skills for the Information Age

U.S. DEPARTMENT OF EDUCATION
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Information Literacy:

Essential Skills for the Information Age

by
Kathleen L. Spitzer
with Michael B. Eisenberg and Carrie A. Lowe

November, 1998

based on
Information Literacy in an Information Society: A Concept for the Information Age
by Christina S. Doyle, 1994

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Kathleen L. Spitzer
Michael B. Eisenberg
Carrie A. Lowe
October, 1998

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Dedication

This book is dedicated to my husband, Gary, whose name is the answer to the question, "How did you manage to write a book?" and to my children, Karen and Steven, for their patience and understanding when I had to spend time writing and editing. I also appreciated the loving support of my parents T. Richard and Lucille Leidig.

Kathleen L. Spitzer

Foreword

As this publication makes so clear, information literacy is not the product of any single profession or country. It is in many ways an amazingly successful grassroots effort of people around the world. Moreover, it remains a much needed commonsense approach for addressing the very real challenge of providing equity of opportunity within today's Information Society.

To date this book is the definitive publication on information literacy. As such, it shall be of much use to educators, librarians and policy leaders who care about people and who are committed to empowering individuals for quality of life. In addition, it will save these proponents and practitioners of information literacy much time and effort by bringing together in one place so much information on the topic.

—Dr. Patricia Senn Breivik
Dean, Library System at Wayne State University
and Chair, National Forum on Information Literacy
November 1998.

To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.

—American Library Association
1989, p. 1

Introduction

A chief financial officer returned home from vacation and found 2,000 e-mail messages waiting for him. He was so overwhelmed that he simply deleted them, thereby eliminating potentially valuable information (Kunde, 1997).

Scientists who needed to record the eclipse of the star Aldebaran from a multitude of viewpoints issued a call to amateur astronomers via the International Occultation Timing Association's Internet Web page. Those who answered the call were asked to tune to the Weather Channel to synchronize the starting of their camcorders to record the event. Videotapes were then forwarded to scientists for analysis (Kluger, 1997).

In October 1987, high winds assaulted the southern half of England, destroying more than 15 million trees and damaging almost one out of every six British houses. British weather forecasters, who were perhaps over confident in relying on their computerized models, failed to predict the worst storm in England in 300 years. French weather forecasters were successful in predicting the severity of this same storm in their geographical area by combining information from computerized prediction models with satellite data and upper-air charts (Norton & Gotts, 1991).

In 1998, over 100,000 students became scientists as they participated in the Journey North, a Web-based initiative co-sponsored by the Annenberg/CPB Math and Science Project. Students tracked the migration of monarch butterflies, American robins, hummingbirds, right whales, and other species, and reported the latitude and longitude of their sightings, along with other descriptive information, via the Internet. They then manipulated the raw data to create maps and conduct other projects demonstrating the migration of these species (The Annenberg/CPB Projects Learner Online, 1998, Online).

As these examples illustrate, information can empower and enable us or overwhelm and confuse us. We are challenged on a daily basis to negotiate through vast amounts of information in a variety of formats. The basic information literacy skills of efficiently and effectively accessing, evaluating, and using information from a variety of sources are essential for survival in the Information Age.

In this book, we will trace the history and development of the term information literacy. We will examine the economic necessity of being information literate, and we will explore the research related to the concept. We will include reports on the National Educational Goals (1991) and on the report of the Secretary's Commission on Achieving Necessary Skills (SCANS, 1991). We will examine recent revisions in national subject matter standards that imply a recognition of the process skills included in information literacy. We will outline the impact information literacy has on K-12 and higher education. And finally, we will provide examples of information literacy in various contexts. We will begin our journey by defining information literacy in Chapter 1.

chapter 1

Defining Information Literacy

In this chapter, we will see how information literacy has been defined by various groups and individuals since its first mention in 1974. We will also briefly examine other literacies that are implicit in information literacy.

In 1974, Paul Zurkowski, president of the Information Industry Association, introduced the concept of "information literacy" in a proposal submitted to the National Commission on Libraries and Information Science (NCLIS). The proposal recommended that a national program be established to achieve universal information literacy within the next decade. According to Zurkowski, "People trained in the application of information resources to their work can be called information literates. They have learned techniques and skills for utilizing the wide range of information tools as well as primary sources in molding information-solutions to their problems" (p. 6).

Two years later, Burchinal (1976), in a paper presented at the Texas A & M University library's symposium, suggested: "To be information literate requires a new set of skills. These include how to locate and use information needed for problem-solving and decision-making efficiently and effectively" (p. 11). That same year, Owens (1976) tied information literacy to democracy stating, "Beyond information literacy for greater work effectiveness and efficiency, information literacy is needed to guarantee the survival of democratic institutions. All men are created equal but voters with information resources are in a position to make more intelligent decisions than citizens who are information illiterates" (p. 27).

Behrens (1994) points out that these and other definitions of the 1970s were developed in response to the rapidly increasing amount of information available and to the fact that it was becoming more difficult to negotiate the complex world of information. During the 1980s, there was a recognition that computers and related technologies were becoming increasingly powerful tools for retrieval and manipulation of information. At the end of the decade, the Final Report of the American Library Association Presidential Committee on Information Literacy (1989) not only recognized the importance of information literacy to a democratic society, but provided a definition in terms of requisite skills: "To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (p. 1). This definition has been widely accepted by those within the library field and forms the basis of subsequent definitions.

In 1992, Doyle published the results of a Delphi study that expanded this definition. Participants in the Delphi study agreed on the attributes of an information literate person, proposing that such a person is one who:

- Recognizes that accurate and complete information is the basis for intelligent decision making
- Recognizes the need for information
- Formulates questions based on information needs
- Identifies potential sources of information
- Develops successful search strategies
- Accesses sources of information including computer-based and other technologies
- Evaluates information
- Organizes information for practical application
- Integrates new information into an existing body of knowledge
- Uses information in critical thinking and problem solving (1992, p. 8).

Since 1992, information literacy has been the topic of scores of publications and has been examined by educational institutions, professional organizations, and scholarly individuals. Many higher education institutions have formed campus wide committees to work toward including information literacy as a graduation outcome. Some are even calling it a new liberal art. As each group or individual has explored information literacy, new definitions have been offered:

> Implicit in a full understanding of information literacy is the realization that several conditions must be simultaneously present. First, someone must desire to know, use analytic skills to formulate questions, identify research methodologies, and utilize critical skills

to evaluate experimental and experiential results. Second, the person must possess the skills to search for answers to those questions in increasingly diverse and complex ways. Third, once a person has identified what is sought, be able to access it (Lenox & Walker, 1993, p. 314).

Information literate students are competent, independent learners. They know their information needs and actively engage in the world of ideas. They display confidence in their ability to solve problems and know what is relevant information. They manage technology tools to access information and to communicate. They operate comfortably in situations where there are multiple answers, as well as those with no answers. They hold high standards for their work and create quality products. Information literate students are flexible, can adapt to change, and are able to function independently and in groups (Colorado Educational Media Association, 1994, p. 1).

. . . (Information literacy includes) the abilities to recognize when information is needed and to locate, evaluate, effectively use, and communicate information in its various formats (State University of New York [SUNY] Council of Library Directors, 1997, Online).

. . . (Information literacy is) a new liberal art that extends from knowing how to use computers and access information to critical reflection on the nature of information itself, its technical infrastructure, and its social, cultural and even philosophical context and impact (Shapiro & Hughes, 1996, Online).

Individuals are information literate if they: recognize that they have a need for information; possess the knowledge and skills that enable them to discover where and how to find the information they are seeking; are comfortable using the necessary tools to find, modify and assimilate that information into another work; and can critically evaluate and synthesize the information they find to understand the social, economic, and political implications of the information (University of Arizona Library, 1996, Online).

. . . Information competence is the fusing or the integration of library literacy, computer literacy, media literacy, technological literacy, ethics, critical thinking, and communication skills (Work Group on Information Competence, Commission on Learning Resources and Instructional Technology, 1995, p. 5).

. . . (Information literacy is) the ability to find, evaluate, use, and communicate information in all of its various formats (Work Group on Information Competence, Commission on Learning Resources and Instructional Technology, 1995, p. 4).

. . . (Information literacy is) the ability to effectively identify, access, evaluate and make use of information in its various formats, and to choose the appropriate medium for communication. It also encompasses knowledge and attitudes related to the ethical and social issues surrounding information and information technology (California Academic and Research Libraries Task Force, 1997, Online).

Although Breivik and the American Library Association support the idea that information literate people know how to find, evaluate, use, and subsequently communicate information effectively to solve particular problems or to make decisions, their definition of information literacy fails to account for sources of information, both visual and aural, beyond the traditional contents of libraries. Whether information comes from a computer, a book, a government agency, a film, a conversation, a poster, or any number of other possible sources, inherent in the concept of information literacy is the ability to dissect and understand what you see on the page or the television

> screen, in posters, pictures, and other images, as well as what you hear. If we are to teach information literacy, we must teach students to sort, to discriminate, to select, and to analyze the array of messages that are presented (Lenox & Walker, 1992, p. 4-5).

These definitions are examples of the ways information literacy extends into the realms of critical thinking and ethical usage of information. The definitions also include the recognition that information may be presented in a number of formats, from the simple to the complex, and may include printed words, illustrations, photographs, charts, graphs, tables, multimedia, sound recordings, computer graphics, or animation. In the future, there may be other formats for presenting information—formats not yet imagined. It is important that we consider all of these possibilities when we use the term *information* and that we not be tied to the mental image of printed words and numbers. Using information in a variety of formats requires literacies beyond the basic literacies of reading and writing. To negotiate complex information formats, we must also be skilled in other literacies: visual, media, computer, network, and, of course, basic literacy. Let's examine these literacies in turn.

Visual Literacy

When we look at visual information such as photographs, illustrations, or computer graphics, we rely on our previous perceptions of the world to make sense of the visual images. **Visual literacy** is defined as the ability "to understand and use images, including the ability to think, learn, and express oneself in terms of images" (Braden & Hortin, 1982, p. 41). Visual literacy may be divided into three constructs:

- Visual learning
- Visual thinking, and
- Visual communication (Randhawa, 1978).

Visual learning refers to "the acquisition and construction of knowledge as a result of interaction with visual phenomenon" (Moore & Dwyer, 1994,

p. 107). Visual thinking involves the ability to "organize mental images around shapes, lines, colors, textures, and compositions" (Wileman, 1980, p. 13). Visual communication is defined as "using visual symbols to express ideas and convey meaning" (Moore & Dwyer, 1994, p. 109). Visual thinking and visual learning may come more easily than visual communication. While many are born with talents for visualization and artistic expression, others are not. For those with less innate artistic ability, visual communication may be accomplished by using a camera or by using a computer graphics program.

Media Literacy

In 1992, representatives of the media literacy movement met at the National Leadership Conference on Media Literacy, and agreed to define **media literacy** as the ability of a citizen to "access, analyze, and produce information for specific outcomes" (Aufderheide, 1993, p. 6). Those who advocate media literacy recognize the influence television, motion pictures, radio, recorded music, newspapers, and magazines have on us daily. The media literacy movement also recognizes the fact that educators have traditionally spent a preponderance of time teaching reading, and little time focusing on media literacy.

In reference to the teaching of media literacy, Cortes (1992) notes that both fictional and nonfictional media provide information, help organize information and ideas, help create, reinforce, and modify values and attitudes, help shape expectations, and provide models for action. By developing lessons organized around these five assumptions, teachers can help students to be critical viewers and listeners who realize that all media are constructions that contain implicit messages.

Computer Literacy

Computer literacy is generally thought of as familiarity with the personal computer and the ability to create and manipulate documents and data via word processing, spreadsheets, databases, and other software tools. Often these skills are taught out of context in special computer classes. Eisenberg and Johnson (1996), however, believe that the computer is a tool that facilitates and extends our abilities to learn and to process information. For example, students can use e-mail to contact their classmates or their teacher to clarify an assignment, or they can use presentation software to present information to the class. As such, computer literacy is seen as an integral part of education and not as a separate entity.

Network Literacy

Closely related to computer literacy is **network literacy** a term that is still evolving. In order to locate, access, and use information in a networked environment such as the World Wide Web, users must be network literate. McClure, noting that the following can be the basis for discussion and research, describes network literacy in terms of knowledge and skills for the general public. A network literate person is one who:

- [Has] an awareness of the range and uses of global networked information resources and services
- [Has] an understanding of the system by which networked information is generated, managed, and made available
- [Can] retrieve specific types of information from the network using a range of information discovery tools
- [Can] manipulate networked information by combining it with other resources, enhancing it, or otherwise increasing the value of information for particular situations
- [Can] use networked information to analyze and resolve both work and personal related decisions and obtain services that will enhance their overall quality of life

- [Has an] understanding of the role and uses of networked information in problem solving and in performing basic life activities (McClure, 1993, p. 160).

The chart, Elements of Information Literacy (Figure 1.1), analyzes visual, media, computer, and network literacy in terms of information literacy. These literacies, as well as others discussed in the literature (i.e. cultural, scientific, technical, global and mathematical), each focus on a compartmentalized aspect of literacy. Information literacy is, in contrast, an inclusive term. Through information literacy, the other literacies can be achieved (Breivik, 1991).

Figure 1.1 Elements of Information Literacy

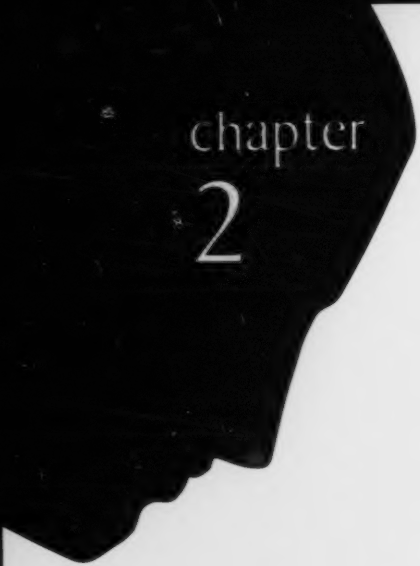
Elements of Information Literacy	Visual Literacy	
An information literate person is one who:	Visual literacy is:	
• recognizes that accurate and complete information is the basis for intelligent decision making		
• recognizes the need for information		
• formulates questions based on information needs		
• identifies potential sources of information		
• develops successful search strategies		
• accesses sources of information		
• evaluates information	the ability to understand,	
• organizes information for practical application	and use images,	
• integrates new information into an existing body of knowledge	including the ability to think, learn and express oneself in terms of images (Braden & Hortin, 1982).	
• uses information in critical thinking and problem-solving (Doyle, 1992).		

	Media Literacy	Computer Literacy	Network Literacy
	Media literacy is:	Computer literacy is:	A network literate person is one who:
			has an awareness of the range and uses of global networked information resources and services;
			has an understanding of the system by which networked information is generated, managed, and made available;
	the ability to access,		can retrieve specific types of information from the network using a range of information discovery tools;
	analyze,		
	and produce information for specific outcomes (Aufderheide, 1992).	the ability to create and manipulate documents and data via software tools.	can manipulate networked information by combining it with other resources, enhancing it, or otherwise increasing the value of information for particular situations;
			can use networked information to analyze and resolve both work and personal related decisions and obtain services that will enhance their overall quality of life;
			has an understanding of the role and uses of networked information in problem solving and in performing basic life activities (McClure, 1993).

Summary

Whatever our personal definition of information literacy may be, it is likely to stem from the definition offered in the Final Report of the American Library Association Presidential Committee on Information Literacy, "To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (p. 1). As we have seen, this definition is reflective not only of the work of Zurkowski but of others who have sought to shape the concept. Let's summarize the key points of this chapter:

- The concept of "information literacy" was first introduced in 1974 by Paul Zurkowski.
- The American Library Association definition of information literacy, "To be information literate requires a new set of skills. These include how to locate and use information needed for problem-solving and decision-making efficiently and effectively" (p. 11) forms the basis for the expansion of the concept.
- Alternative definitions for information literacy have been developed by educational institutions, professional organizations, and individuals.
- Since information may be presented in a number of formats, the term information applies to more than just the printed word. Other literacies such as visual, media, computer, network, and basic literacies are implicit in information literacy.



chapter 2

The Evolution of a Concept

The Final Report of the American Library Association Presidential Committee on Information Literacy (1989) provided the springboard for the development of the concept of information literacy. In this chapter, we will explore how information literacy has developed in both K-12 and higher education in the United States. We will also examine other constituencies that embrace the concept and provide examples of the importance of information literacy in other countries.

The evolution of the concept of information literacy, since Zurkowski first used the term in 1974, has taken place both within and outside of the field of library science, and not only in the United States, but also throughout the world. Librarians have been especially sensitive to the so-called information explosion and its resultant repercussions. The concept of information literacy, which advocates the preparation of people to be successful users of information, addresses the concerns librarians have with the evolving nature of information sources, and the overwhelming amount of information available. Those outside of the field of library science have also acknowledged the effects of the exponential growth of information.

Development of National Importance

The seminal event in the development of the concept of information literacy was the establishment of the American Library Association (ALA) Presidential Committee on Information Literacy in 1987. The committee, established by ALA President Margaret Chisholm, consisted of seven national leaders from the field of education and six from the field of librarianship. Their final report, released in January 1989, provided a definition of information literacy to which all could refer, and precipitated the dissemination of the concept of information literacy beyond the field of library science. The committee asserted that information literacy was a necessary skill for everyday life, for the business world, and for democracy:

> How our country deals with the realities of the Information Age will have enormous impact on our democratic way of life and on our nation's ability to compete internationally. Within America's information society, there also exists the potential of addressing many long-standing social and economic inequities. To reap such benefits, people as individuals and as a nation must be information literate. To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. Producing such a citizenry will require that schools and colleges appreciate and integrate the

> concept of information literacy into their learning programs and that they play a leadership role in equipping individuals and institutions to take advantage of the opportunities inherent within the information society. Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand (American Library Association Presidential Committee on Information Literacy, 1989, p. 1).

Six recommendations were outlined:

1. We all must reconsider the ways we have organized information institutionally, structured information access, and defined information's role in our lives at home, in the community, and in the work place.

2. A Coalition for Information Literacy should be formed under the leadership of the American Library Association, in coordination with other national organizations and agencies, to promote information literacy.

3. Research and demonstration projects related to information and its use need to be undertaken.

4. State Departments of Education, Commissions on Higher Education, and Academic Governing Boards should be responsible to ensure that a climate conducive to students' becoming information literate exists in their states and on their campuses.

5. Teacher education and performance expectations should be modified to include information literacy concerns.

6. An understanding of the relationship of information literacy to the themes of the White House Conference on Library and Information Services should be promoted (pp. 11-12).

National Forum on Information Literacy (NFIL)

Based on the recommendation of the American Library Association, a coalition for information literacy was "strategized" at an ALA sponsored meeting in April 1989 in Leesburg, Virginia. The first meeting of the National Forum on Information Literacy (NFIL) took place on November 9, 1989, with Patricia Senn Breivik serving as chair. NFIL is a coalition of over 65 national organizations from business, government and education, all sharing an interest in, and a concern for, information literacy. NFIL has met regularly since 1989 to promote the concept of information literacy as an imperative for the Information Age, and to spread the concept to all professions.

NFIL is committed to fostering public awareness of the need for information literate people. Breivik summarized the coalition's activities in a 1998 progress report. The coalition is:

- Identifying organizations whose purposes can be enhanced through the promotion of information literacy and inviting membership in or affiliation with the coalition

- Encouraging member organizations and individuals to advocate appropriate actions to promote information literacy

- Providing a national forum for the exchange of ideas and programs so as to create public awareness of the need for information literacy and to collect specific examples of how information literacy may affect individual Americans

- Developing a public awareness program using press releases, public service announcements, and other means to alert citizens to the importance of information literacy

- Monitoring emerging trends and patterns and encouraging research and demonstration projects, and

- Promoting the establishment of a clearinghouse to gather and disseminate information on programs of information literacy and on efforts to promote information literacy.

NFIL member associations are diverse. Membership includes representatives from the American Association for Higher Education, American Association of Colleges for Teacher Education, American Association of School Administrators, Association for Supervision and Curriculum Development, College Board, EDUCAUSE, Hispanic Policy Development Project, International Visual Literacy Association, National Association of Secondary School Principals, National Consumers League, National Council for Social Studies, National Education Association, National Forum for Black Public Administrators, National School Boards Association, and the U.S. Small Business Administration. Early meetings of NFIL focused on definitions and procedure. Gradually, supporting member associations have included the topic of information literacy on their individual conference agendas. Dissemination from NFIL has been in the form of publications, especially in association journals and in-house newsletters from NFIL members.

In *A Progress Report on Information Literacy: An Update on the American Library Association Presidential Committee on Information Literacy: Final*

Report (1998), a publication written on behalf of NFIL, Breivik, Hancock, and Senn examine the progress made since the 1988 Final Report was issued and examine the future of information literacy. The authors state that ". . . Forum members—after monitoring America's progress in addressing the issues raised in the Report of the Information Age [Final Report, 1988]—believe that there needs to be a national reevaluation of the seemingly exclusive emphasis on and enormous investments in computers and networks. They believe that the technology alone will never allow America to reach the potential inherent in the Information Age in not only its schools but also in its businesses. In fact, they believe that the dreams of a new and better tomorrow will only begin to be realized when all young people graduate into the workforce with strong information literacy skills" (1998, p. 7).

The progress report states that Forum members have agreed upon the following five recommendations for priority action in the new millennium:

> "Recommendation 1: Forum members should encourage and champion the growing support of accrediting agencies. [See Chapter 2 for background information about accreditation agencies.]
>
> Recommendation 2: Teacher education and performance expectations need to include information literacy skills.
>
> Recommendation 3: Librarian education and performance expectations need to include information literacy.
>
> Recommendation 4: Forum members need to identify ways to illustrate to business leaders the benefits of fostering an information literate workforce.
>
> Recommendation 5: There needs to be more research and demonstration projects related to information literacy and its use." (pp. 7-8).

The NFIL recognizes the valuable contributions of individuals in the development and dissemination of the concept of information literacy. The Forum invites individuals to send in reports of their information literacy efforts so that progress can be monitored. NFIL maintains a listserv at *http://infolit@ala1.ala.org*

Development in K-12 Education

The history of information literacy in K-12 education began in April 1983, when the National Commission on Excellence in Education issued a report decrying the lack of rigorous education in America's schools. The commission's report, *A Nation at Risk* (1983), noted that American education standards had declined to the point where, "If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war" (p. 5). While the report identified the management of complex information in electronic and digital forms as an important skill in a "learning society," it did not contain recommendations on the role of the library or on the role of information resources in K-12 education. In response to this report, The National Commission on Libraries and Information Science (NCLIS) unanimously advocated "the importance of the role of library and information resources to underpin all learning and . . . the essential skills and proficiencies involved in finding and using information effectively. A basic objective of education is for each student to learn how to identify needed information, locate and organize it, and present it in a clear and persuasive manner" (Hashim, 1986, p. 17).

NCLIS members, in the process of responding and developing strategy, agreed that a concept paper should be written to define what is meant by "information skills," as well as to identify the issues, questions, and problems related to the development of these skills. In "Educating Students to Think: The Role of the School Library Media Program" (Mancall, Aaron & Walker, 1986), three relevant components of a school library media program were described. These components are:

1. The role of school library media programs in helping students develop thinking skills
2. The theoretical implications of current research on how children and adolescents process information and ideas, and
3. The practical implications and applications of the concepts as a basis for developing an information skills program in all curricular areas.

As the concept of information literacy developed, an empirical and logical base for the concept needed to be identified. In 1987, Kuhlthau's *Information Skills for an Information Society: A Review of the Research* carved out a niche for information literacy—a base to which all could refer in the next stages of development and implementation.

In her monograph, Kuhlthau included library skills and computer literacy in the definition of information literacy. It is important to note that library skills were described as "proficiency in inquiry" to correct the misconception that such skills are reserved only for the library. The library is an effective wellspring for these skills, but the larger focus is on student learning. Kuhlthau addressed two major themes in her monograph:

- Library media programs should integrate information literacy across curricular areas to develop students' proficiency in inquiry.
- Information technologies provide access to information resources that are critical to student learning.

Kuhlthau's work pointed the way to the integration of information literacy with curriculum, and presages current development of the concept of information literacy where the library media program is the starting platform.

Information Power

In 1988, the American Association of School Librarians (AASL), a branch of the American Library Association (ALA), published *Information Power:*

Guidelines for School Library Media Programs. These guidelines were significant because they were developed using an innovative approach.

First, the guidelines were developed cooperatively with the Association for Educational Communications and Technology (AECT), another national professional organization with similar concerns. Secondly, the guidelines were stated in qualitative, rather than in quantitative terms. The vision presented in *Information Power* is of a school library media program that significantly expanded the access to and use of information and ideas by students, teachers, and parents.

The stated mission of *Information Power* is "to ensure that students and staff are effective users of ideas and information" (ALA, 1988, p. 1). This mission is accomplished by:

- Providing intellectual and physical access to materials in all formats
- Providing instruction to foster competence and stimulate interest in reading, viewing, and using information and ideas, and
- Working with other educators to design learning strategies to meet the needs of individual students (p. 1).

Information Power called for a shift in the role of the library media specialist from a passive "keeper of materials" to a key participant in the learning process. Library media specialists were to be perceived as change agents in the restructuring of the educational process (Eisenberg & Berkowitz, 1988). Accepted roles of the library media specialist included: providing for a variety of resources as the basis for experiential learning; sharing the process by which students acquire needed information skills with teachers; and encouraging students to pursue individual interests.

Development of Information Literacy Standards for Student Learning

In 1994, the American Association of School Librarians (AASL) published a position statement that identified the steps of the information problem-solving process as the key elements of an information literacy curriculum. The position statement was based on *Information Literacy: A Position Paper on Information Problem-Solving* (1993), a publication that had been developed by the Wisconsin Educational Media Association (WEMA). These steps, which were also endorsed by the NFIL, include:

- Defining the need for information
- Initiating the search strategy
- Locating the resources
- Accessing and comprehending the information
- Interpreting the information
- Communicating the information
- Evaluating the product and process.

The position statement advocates the importance of information literacy skills in the school restructuring movement:

> Research on the restructuring of schools calls for the teacher's role to change from a textbook lecturer to that of a coach. Students become active learners who create their own knowledge after interacting with information from a variety of resources . . . To become effective information users, students must have frequent opportunities to handle all kinds of information. Locating, interpreting, analyzing, synthesizing, evaluating, and communicating information should become a part of every subject across the curriculum. (*Emergency Librarian*, Nov./Dec. 1995, pp. 20-23).

The position statement envisions the library media specialist as a collaborator who works with teachers to integrate information literacy skills into the curriculum and to facilitate the change from textbook based learning to learning that incorporates a variety of resources.

Throughout the next few years, information literacy standards and indicators were developed by AASL and AECT as part of the process of revising *Information Power*, the national guidelines for school library media programs. Input on information literacy standards was sought from members of the field and other educators throughout the development process via electronic mail and through formal hearings held at AASL and AECT conferences. During 1996-97, a panel of 57 educators from within and outside of the school library media field took part in a national Delphi study designed to formally validate the standards and indicators. Four rounds of the study were conducted with panelists reacting to drafts that incorporated the suggestions and insights of the participants. The *Information Literacy Standards for Student Learning* published in *Information Power: Building Partnerships for Learning* (ALA & AECT, 1998) are the result of this extensive process.

The *Information Literacy Standards for Student Learning* are articulated in three categories: information literacy, independent learning, and social responsibility. Within the three categories are nine standards and 29 indicators to describe the content and processes students need to achieve to be information literate (see Appendix A, ALA & AECT, 1998). Three levels of proficiency for each indicator are outlined: basic, proficient, and exemplary. Examples of the standards in action are given to show how each could be integrated with the curriculum. Each information literacy standard is also cross correlated with selected examples from the content-area standards demonstrating how information literacy is inherent in each. The nine standards are:

Category I: Information Literacy

Standard 1: The student who is information literate accesses information efficiently and effectively.

Standard 2: The student who is information literate evaluates information critically and competently.

Standard 3: The student who is information literate uses information accurately and creatively.

Category II: Independent Learning

Standard 4: The student who is an independent learner is information literate and pursues information related to personal interests.

Standard 5: The student who is an independent learner is information literate and appreciates and enjoys literature and other creative expressions of information.

Standard 6: The student who is an independent learner is information literate and strives for excellence in information seeking and knowledge generation.

Category III: Social Responsibility

Standard 7: The student who contributes positively to the learning community and to society is information literate and recognizes the importance of information to a democratic society.

Standard 8: The student who contributes positively to the learning community and to society is information literate and practices ethical behavior in regard to information and information technology.

Standard 9: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information. (ALA & AECT, *Information Power: Building Partnerships for Learning,* 1998).

In addition to being incorporated in *Information Power: Building Partnerships for Learning,* the standards are available as a separate publication designed for disseminating the standards to teachers, principals, parents, school boards, and administrators. The standards have been further disseminated in the American Library Association's *Indicators of Schools of Quality, Volume 1: Schoolwide Indicators of Quality,* a publication developed by the National

Study of School Evaluation (NSSE) in cooperation with Alliance for Curriculum Reform (ACR). The publication is intended to assist schools in self-assessing the quality of their efforts in improving student learning (ALA & AECT, "Information Literacy Standards for Student Learning" in *Indicators for Schools of Quality,* 1998).

Information Power: Building Partnerships for Learning notes that the mission of the library media program remains the same as in 1988's *Information Power*— ensuring that students and staff are effective users of ideas and information. The publication points out that the achievement of that mission depends on school library media programs and services focused on information literacy. The essential elements of the library media program that support this mission are identified as: learning and teaching, information access, and program administration. Each element denotes a number of principles upon which an effective school library media program is based. Among the *Learning and Teaching Principles of School Library Media Programs* that fully support the integration of information literacy skills with the curriculum are:

> **Principle 1:** The library media program is essential to learning and teaching and must be fully integrated into the curriculum to promote students' achievement of learning goals.
>
> **Principle 2:** The information literacy standards for student learning are integral to the content and objectives of the school's curriculum (AASL & AECT, 1998, p. 58).

The library media specialist's role in bringing the school library media program to fruition involves collaboration, leadership, and technology. *Information Power: Building Partnerships for Learning* notes that "collaboration is essential as library media specialists work with teachers to plan, conduct, and evaluate learning actiyities that incorporate information literacy" (p. 50).

As such, the library media specialist must be conversant with the curriculum, be able to connect learning objectives with information literacy, and establish a good relationship with teachers. The library media specialist provides leadership in changing from textbook-based learning to information-based learning and acts a technologist who can collaborate to design instructional experiences that fully integrate technology.

Information Power: Building Partnerships for Learning provides a basis for the school library media program to take the lead in educating students to be information literate thereby providing them with the basic skills they will need to succeed in the Information Age.

Canadian School Libraries

The Association for Teacher-Librarianship in Canada created a *Student's Bill of Information Rights* in 1995 which has much in common with the AASL and AETC *Information Literacy Standards for Students Learning*. It states:

> Our students face an information-rich future in which change will be one of the few constants of their life experience. Their ability to adapt and fulfill their individual potentials will require them to be life-long learners and independent decision-makers.
>
> We believe that all students should have the opportunity to:
>
> - Master the skills needed to access information in print, non-print and electronic sources
> - Understand and master effective research processes and reporting skills
> - Develop the ability to evaluate, extract, synthesize and utilize information from a variety of sources and media
> - Utilize data and information to expand their own knowledge base
> - Explore the creative use of information
> - Develop an understanding of our Canadian cultural heritage and history, as well as cultures and histories of other societies

> - Enhance their own self knowledge through developing a love of reading
> - Explore the values and beliefs of others by reading world literature
> - Think critically, and make decisions based on personal needs and values as well as upon factual evidence, and
> - Actively participate in decisions about their own learning.
>
> Information is a vital component in the development of critical thought and independent decision-making, and, consequently, access to the ever-increasing body of available information is vital to the development of students' potentials (Association for Teacher-Librarianship in Canada, 1995, Online).

In November 1997, the Canadian School Library Association and the Association for Teacher-Librarianship in Canada issued a joint document referring to the *Students' Bill of Information Rights* (1995). The document, *Students' Information Literacy Needs in the 21st Century: Competencies for Teacher-Librarians* (1997), focuses on the need for highly skilled and educated teacher-librarians who will have an impact on students' development of information literacy skills.

> Students in Canada today need to be able to think rationally and logically. With more and more sources of information, both print and electronic, and the increasing difficulty of ensuring that students can derive meaning from this information, the role of the teacher-librarian becomes central. Teacher-librarians are skilled in accessing and evaluating information regardless of delivery system, book or computer, and providing leadership in the appropriate use of new information technologies (Association for Teacher Librarianship in Canada and Canadian School Library Association, 1997, Online).

Noting that there is a body of research that points to the positive impact of the teacher-librarian on student achievement, and that teachers collaborate more in schools where there is a teacher-librarian, the document points out that

> . . . information literacy is incorporated into school and classroom programs because:
>
> - The program is recognized as a partnership of the principal, teacher and teacher-librarian, supported by the school district and community
> - The district insists on flexible scheduling. The teacher-librarian is not the preparation time or 'relief' for classroom colleagues
> - The principal encourages collaboration and team teaching through this flexible schedule
> - Teachers acknowledge that the processing and use of information is a school-wide concern, for integration with classroom content instruction, and
> - The teacher-librarian takes the initiative, places a priority on cooperative program planning with colleagues and encourages team planning (1997).

Through this document, the Canadian School Library Association and the Association for Teacher-Librarianship in Canada highlight the professional and personal competencies of teacher-librarians and provide practical examples of the roles and tasks that they perform.

Development in Higher Education

Academic librarians have played an integral part in the development of the concept of information literacy. *College*, the 1986 Carnegie Foundation Report, outlined the importance of an academic library program to the undergraduate experience:

> The quality of a college is measured by the resources for learning on the campus and the extent to which students become independent,

> self-directed learners (Prologue and Major Recommendations of Carnegie Foundations Report on Colleges, 1986, p. 21).

Calling for undergraduates to spend ". . . at least as much time in the library . . . as they spend in classes" (p. 21), the report recommended that academic institutions establish basic books libraries, and that academic librarians provide undergraduates with instruction in the use of information resources both inside and outside of the library.

This broader view of information skills instruction was the focus of a symposium co-sponsored by Columbia University and the University of Colorado in March 1987. The symposium, *Libraries and the Search for Academic Excellence*, brought together academic leaders and leaders in the field of librarianship to examine the role of libraries in academia. The outcomes and action recommendations resulting from the symposium institutionalized the importance of information literacy skills and formed the basis for current information literacy efforts in higher education:

> Reports on undergraduate education identify the need for more active learning whereby students become self-directed independent learners who are prepared for lifelong learning. To accomplish this, students need to become information literate whereby they
>
> - Understand the process and systems for acquiring current and retrospective information, e.g., systems and services for information identification and delivery
> - Are able to evaluate the effectiveness and reliability of various information channels and sources, including libraries, for various kinds of needs
> - Master certain basic skills in acquiring and storing their own information, e.g., database skills, spreadsheet skills, word and information processing skills, books, journals, and report literature
> - Are articulate and responsible citizens in considering current and

> future public policy issues relating to information, e.g., copyright, privacy, privatization of government information, and those issues yet to emerge.
>
> To make possible the above, information gathering and evaluation skills need to be mastered at the undergraduate level, and learning opportunities should be integrated within the existing departments, analogous, to writing across the curriculum, rather than as standalone bibliographic instruction programs. Administrators, faculty and librarians should be engaged in creative new partnerships which transmit to students the value and reward of research in their lives as students and beyond. Information literacy should be a demonstrable outcome of undergraduate education (Breivik & Wedgeworth, 1988, pp. 187-188).

Information Literacy, published in 1989, outlined the challenges posed to academic institutions to reform instruction and meet the information demands of students and faculty as outlined in the outcomes and action recommendations of the symposium. Co-authored by Patricia Senn Breivik, who was at the time, the library director at the University of Colorado at Denver, and Gordon Gee, who at that time was president of the Colorado University system, *Information Literacy* noted that academic institutions realize that it is important to graduate students who can analyze information and think effectively. To develop these important information skills, Breivik and Gee suggested that faculty initiate library-based instruction that would require students to use a wide range of materials from the campus library, as well as from outside sources.

Academic institutions have been engaged in efforts to define information competencies and to develop and integrate information skills instruction (see Chapter 8). In *Student Learning in the Information Age* (1998), Breivik notes that information skills instruction is usually delivered through stand alone courses, course related instruction, and course integrated instruction. Suggesting that information literacy skills are best taught through the course-integrated approach, Breivik provides numerous examples of information literacy initiatives that academic librarians and institutions could use to develop similar efforts on their own campuses.

Accreditation

Accreditation agencies have been influential in fostering the concept of information literacy as a means of creating a more active undergraduate learning environment. The Commission on Higher Education (CHE), Middle States Association of Colleges and Schools, which accredits institutions of higher education in Delaware, the District of Columbia, Maryland, New Jersey, New York, Pennsylvania, Puerto Rico, The Republic of Panama, and the U.S. Virgin Islands was the first such agency to become a member of the National Forum on Information Literacy (NFIL).

The CHE developed the following standard on information literacy in 1994:

> Each institution should foster optimal use of its learning resources through strategies designed to help students develop information literacy—the ability to locate, evaluate, and use information in order to become independent learners. It should encourage the use of a wide range of non-classroom resources for teaching and learning. It is essential to have an active and continuing program of library orientation and instruction in accessing information, developed collaboratively and supported actively by faculty, librarians, academic deans, and other information providers (in Commission on Higher Education, 1995, p. v).

The CHE was also involved in sponsoring a 1994-95 national survey of 3,236 accredited U.S. colleges and universities, conducted to determine the extent to which information literacy had been assimilated into the curriculum of institutions of higher education. The decision to conduct the survey resulted from a meeting of the National Forum on Information Literacy (NFIL), involved the Association of College & Research Libraries (ACRL), the Commission on Higher Education (CHE) of the Middle States Association of Colleges and Schools, and the Western Accrediting Commission for Senior Colleges and Universities (WASC), and was strongly supported by the American Association for Higher Education. Participants were asked to respond to five questions.

1. Does your campus have a functional information literacy program?
2. Does your campus offer a course that focuses on the development of information literacy abilities?
3. Are information literacy experiences integrated into courses in all majors?
4. Are there formal assessments of students' information literacy performance?
5. Are there faculty and staff development efforts provided to undergird the information literacy program on your campus?

Of the 3,236 surveys distributed, 834 surveys were returned. While noting that there may be limitations to the data due to the possible ambiguity of the respondents' meaning of the term information literacy, the survey report stated that schools in the Middle States region were leading the way toward the integration of information literacy in the curriculum. The results showed that:

- 22% of the respondents had a functional information literacy program
- 25% offered a course that focuses on the development of information literacy abilities
- 17% integrated information literacy experiences into courses in all majors
- 17% stated that there were formal assessments of students' information literacy performance
- 29% of the respondents noted that there were faculty and staff development efforts provided to undergird the information literacy on their campus (Ratteray & Simmons, 1995).

Building on the results of information gained from the survey, the Commission on Higher Education of the Middle States held two symposia in 1995 to bring together educators who had successfully integrated information literacy into their curricula. The conclusions of these symposia were:

> Institutions should concentrate on developing effective processes to achieve information literacy and share with other institutions the results, both good and bad, of those efforts.
>
> Information literacy does not cease when the degree is achieved, but it must be viewed as a lifelong learning commitment (p. 16).

Ralph A. Wolff, Associate Executive Director of the Accrediting Commission for Senior colleges and Universities of the Western Association of Schools and Colleges (WASC) echoes Middle States and adds: "Embracing information literacy is more than a responsibility of the library. It is an institutional concern. The faculty should play a vital role in defining the content and place of information literacy within the curriculum. It cannot avoid this issue if students are to be prepared effectively for the future. Every program should determine the appropriate information skills needed for graduates" (1994, p. 135-136). The WASC, which accredits public and private schools, colleges and universities in California, Hawaii, and several territories, is currently reviewing its standards for accreditation, and will consider the inclusion of a standard on information competence.

In 1997, the California Academic and Research Libraries (CARL) established a Task Force to Recommend Information Literacy Standards to the WASC. A draft version of the task force's recommendations includes a *Statement of Principles for Information Literacy Criteria* that focuses on institutions' roles in developing information literate graduates:

> An institution ensures that all graduating students are information literate through a systematic and course-integrated campus-wide

information literacy program. Information literacy learning opportunities are part of general education, academic majors, and graduate/professional programs. Educational program requirements or goals include statements about students' use of libraries, computing, information and learning resources and how course assignments contribute to their becoming information literate. Professional staffs with appropriate expertise are available to teach information literacy skills and develop collections, learning resources and information literacy curricula and learning experiences. The institution provides support for maintaining and improving the quality of information literacy instruction (1998, Online).

Support for Information Literacy From the Field of Education

Groups representing educators deem the concept of information literacy important. For example, the American Association of Higher Education (AAHE), an organization with over 8,700 members including faculty, administrators and students, has an Action Community on Information Literacy, and sponsors the theme at each of its annual conferences. The National Education Association (NEA) has been active in support of information literacy as well. Sylvia Seidel, Assistant Director of Teacher Education Initiatives for the National Education Association (NEA), states that "The NEA recognizes the importance of information literacy and is presently pursuing strategies for embedding information literacy in their teacher education initiatives" (1997, personal correspondence, December 8, 1997).

The Association for Supervision and Curriculum Development (ASCD) has been a member of the National Forum on Information Literacy (NFIL) from the beginning. ASCD's resolutions for 1991 demonstrate commitment to the importance of information literacy:

> **Resolution on Information Literacy**
>
> Today's information society transcends all political, social, and economic boundaries. The global nature of human interaction makes the ability to access and use information crucial. Differences in cultural orientation toward information and symbol systems make the management of information complex and challenging. Current and future reform efforts should address the rapidly changing nature of information and emerging information technologies. Information literacy, the ability to locate, process, and use information effectively, equips individuals to take advantage of the opportunities inherent in the global information society. Information literacy should be a part of every student's education experience. ASCD urges schools, colleges, and universities to integrate information literacy programs into learning programs for all students (ASCD in Doyle, 1994, p. 12).

Articles on information literacy have been published in the journal *Educational Leadership* and *Education Update* newsletters, both of which are publications of the ASCD, and a current ERIC Digest (Hancock, 1993) on information literacy was written by the ASCD representative to NFIL. In addition, several information literacy related presentations have been on the schedule of ASCD's annual conferences since 1992.

In 1988, the National Council for the Social Studies (NCSS) Ad Hoc Committee on Scope and Sequence developed *Essential Skills for Social Studies*, a K-12 scope and sequence that included acquiring information, organizing and using information, and interpersonal relationships and social participation. The Essential Skills are included in the NCSS Curriculum Standards published in 1994. The NCSS publication *From Information to Decision Making: New Challenges for Effective Citizenship* (1989) focuses on information literacy skills and provides ". . . ideas about ways social studies teachers may become effective in an information age with its ever increasing gap between what we understand and what we need to understand" (p. vii).

The council is an active member of the NFIL and has endorsed the AASL position statement on information literacy.

Information Literacy Embraced Around the World

A review of the literature demonstrates that the concept of information literacy is embraced throughout the world. Both rich and poor countries recognize that education in information literacy skills is essential to produce a workforce of flexible lifelong learners which is increasingly a pre-requisite to economic development.

Namibia

Despite the fact that there is a great disparity in educational resources in schools in Namibia, Basic Information Science is a compulsory subject (Jacobs, 1995). This disparity was taken into account when a committee appointed by the Minister of Basic Education and Culture developed the syllabus. Teachers instruct students in information skills by using the natural environment, the village, and historical and cultural sites, as well as friends, leaders and elders as sources of information. Skills taught include: being alert, observation, interpretation, describing observations, making inquiries, appropriate communication techniques, attentive listening, formulation of questions, taking notes and presenting information. The Basic Information Science subject is intended to foster ". . . an appreciation of the value of information in the context of the information age as a necessity to develop intellectually, socially, politically and economically and to make informed decisions" (Jacobs, 1995, p. 74).

South Africa

A paper presented by Olen at the 1995 Annual Conference of the International Association of School Librarianship details an information skills project for teachers in South Africa. The focus of the endeavor was to help teachers create projects that would allow pupils to ". . . develop the information skills necessary to locate, select, organize and present information in a systematic way" (Olen, 1995, p. 59). Olen, a member of the Department of Information Science at the University of South Africa, reports that a literature survey shows that ". . . subject teachers in secondary schools and lecturers in tertiary institutions should be role models for their pupils and students with regard to reading and information literacy development" (p. 57). Because many South African teachers lack experience with a school library in their own childhood educational backgrounds, they have difficulty creating projects that use a variety of resources or provide students with opportunities to develop information literacy skills. Olen suggests that the information skills project, created to mediate this lack of experience, could be replicated and used as a model for teacher education programs in South Africa.

Australia

Information literacy is a well-developed and accepted concept in Australia, where the third national conference on information literacy was held in December 1997. The Australian Library and Information Association (ALIA) has an information literacy task force dedicated to the following:

- To foster a common understanding of information literacy within ALIA and the general community

- To promote the role of library and information services personnel in the development of their clients' information literacy competencies, and

- To monitor and report to the General Council on national efforts to promote information literacy and resource-based learning (ALIA, 1997, Online).

A number of Australian universities have embraced the information literacy concept; among them Ballarat University, whose information literacy Web page *(http://www.ballarat.edu.au/is/ej/infolit/index.html)* contains a link to Prompts for Good Practice. The document asks a number of pertinent questions to help educators and administrators identify areas where students can find a range of information sources and acquire information literacy skills. Authors Christine Bruce and Philip Candy have arranged questions in three subsections:

- **Subjects or units of instruction** asks teachers to reflect on their units, approaches to teaching, and assessment
- **Courses or programs** in instruction focuses on course coordinators who seek to integrate information literacy skills with entire courses, and
- **Institutional, or university support structures** centers on those who do not teach courses (e.g. staff developers, librarians, learning counselors, administrators) and provides prompts to create an atmosphere that will foster information literacy.

Griffith University's Web site *(http://www.gu.edu.au/gwis/ins/infolit/home.htm)* links to an information literacy blueprint developed by Christine Bruce. This document examines the theory of information literacy, identifies the characteristics of an information literate person, and presents a strategic plan for integrating information literacy into the curriculum.

Canada

The University of Calgary (Canada) Information Literacy Group was formed to develop an action plan to help the University develop information literacy strategies. The group provides a definition of information competency:

Within the context of lifelong learning and the broad information continuum, which ranges from data to knowledge to wisdom, information literacy competency focuses on five broad abilities:

- To recognize the need for information
- To know how to access information
- To understand how to evaluate information
- To know how to synthesize information
- To be able to communicate information.

An information literate person recognizes the different levels, types and formats of information and their appropriate uses. The ability to place information in a context and an awareness of information access issues (copyright, privacy, globalization, currency of information, etc.) are key to information literacy (University of Calgary Information Literacy Group, 1998, Online).

Rader (1996) notes that the importance of having an information literate population is supported by the Canadian government's information policy, and that Canadian librarians hold an annual conference to focus on the topic of information literacy.

Finland

In 1994, the Ministry of Education in Finland formed an Expert Committee to prepare a strategy for education, training and research in the information society of the 21st century. Among the elements of *Education, Training, and Research in the Information Society: A National Strategy* published in 1995 are information skills for:

- **Students:** It is the task of general education to provide every girl and boy with the versatile basic skills in acquiring, managing and communicating information which are necessary in the information society and essential for successful further study (p. 38).

- **Adults:** The opportunities for adults to learn the basic skills of acquiring and managing information, communicating and using information technology, and to subsequently upgrade these skills, must be improved (p. 40).

- **Teachers:** All teachers need new knowledge, skills and competencies (sic.) in order to be able to use information technology as a tool in their teaching work. They must also become familiar with applications in their respective fields. Teachers of all subjects need to know how to utilize information technology and take account of the requirements of the information society in their work (p. 40).

- **Business:** In the information society, the skills related to the acquisition and management of information are an increasingly essential part of professional competence in every field. In addition to basic general skills, mastery of the working methods and equipment essential for the practice of a chosen profession is essential. For all persons, information technology skills become increasingly important as a factor affecting employability (p. 41).

Each administrative branch of the government will make action plans to implement the strategy which will provide every citizen the opportunity to acquire new skills and access to information.

Summary

In this chapter we have seen that although the concept of information literacy emanated from the library profession, it has been embraced by those within and outside of the library profession throughout the world. Key points in this chapter include:

- The seminal event in the development of the concept of information literacy was the establishment of the American Library Association (ALA) Presidential Committee on Information Literacy in 1987 whose final report outlines the importance of the concept.
- The Presidential Committee on Information Literacy precipitated the formation of the National Forum on Information Literacy, a coalition of more than 65 national organizations, that seeks to disseminate the concept.

- The development of information literacy in K-12 education began with the publication of *A Nation at Risk* in 1983. *A Nation at Risk* identified the management of complex information in electronic and digital forms as an important skill in a "learning society," but it did not contain recommendations on the role of the library or on the role of information resources in K-12 education. In response, NCLIS members agreed that a concept paper should be written to define what is meant by "information skills." As a result, "Educating Students to Think: The Role of the School Library Media Program" was published in 1986 by Mancall, Aaron, & Walker.

- Kuhlthau's *Information Skills for an Information Society: A Review of Research*, published in 1987, included library skills and computer literacy in the definition of information literacy. Library skills were described as "proficiency in inquiry" to correct the misconception that such skills are reserved only for the library.

- The American Association of School Librarians has fully embraced information literacy as an essential component of K-12 education. AASL's 1988 publication, *Information Power: Guidelines for School Library Media Programs*, states that the mission of the school library media program is "to ensure that students and staff are effective users of ideas and information" (ALA, 1988, p. 1). AASL's newest guidelines, published in 1998, *Information Power: Building Partnerships for Learning*, reiterates this mission and includes the *Information Literacy Standards for Student Learning*.

- Both the Canadian School Library Association and the Association for Teacher-Librarianship in Canada confirm the importance of information literacy in education and the role of the school library in educating students to be information literate.

- *College,* the 1986 Carnegie Foundation Report, outlined the importance of an academic library program to the undergraduate experience. A symposium co-sponsored by Columbia University and the University of Colorado in March 1987, *Libraries and the Search for Academic Excellence,* resulted in outcomes and action recommendations that institutionalized the importance of information literacy skills and form the basis for current information literacy efforts in higher education.

- Accreditation agencies such as the Western Association of Schools and Colleges (WASC), and the Commission on Higher Education (CHE) Middle States Association of Colleges and Schools, have been influential in elevating the importance of information literacy in higher education.

- Other groups have been active in their support of information literacy. These groups include the American Association of Higher Education (AAHE), the National Education Association (NEA), the Association for Supervision and Curriculum Development (ASCD), and the National Council for the Social Studies (NCSS).

- Examples from around the world demonstrate that information literacy is deemed an important concept, most frequently tied to concerns for citizens becoming lifelong learners and promoting economic development.

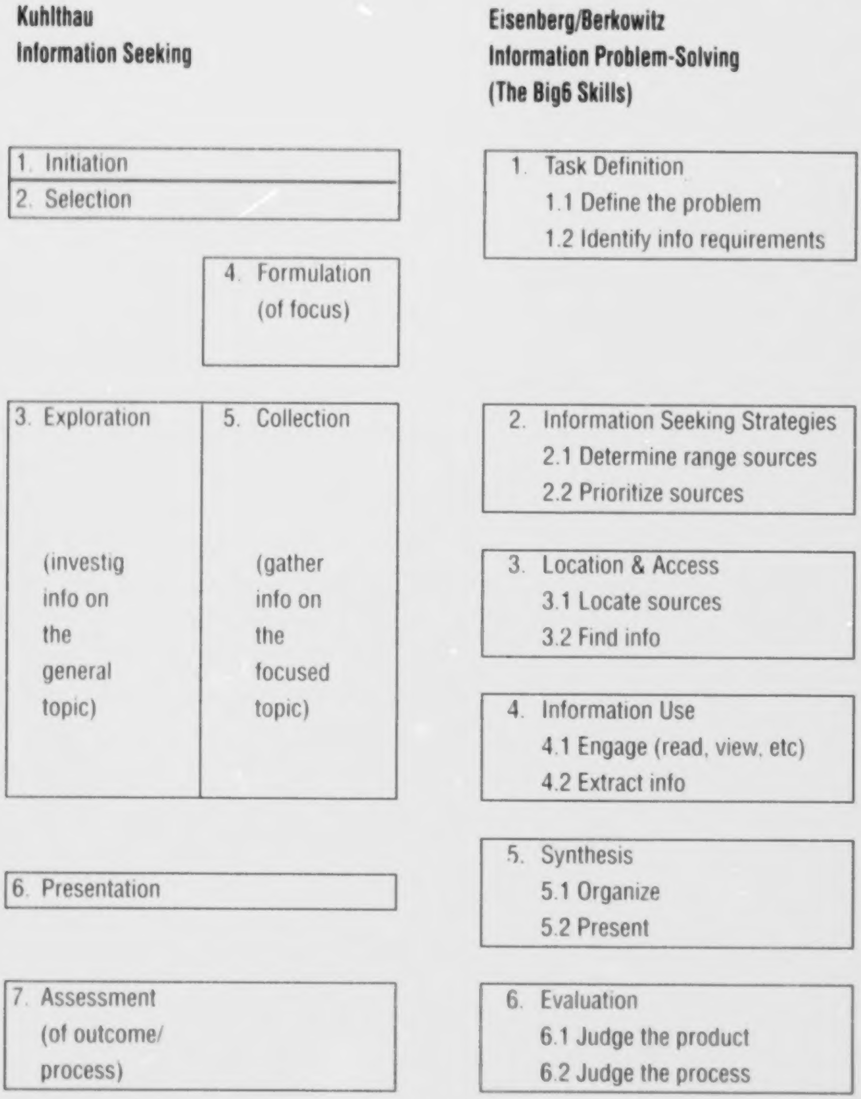
chapter 3

Information Literacy Research

Information literacy skills are the necessary tools that help us successfully navigate the present and future landscape of information. In this chapter, we will examine the body of research relating to information literacy in terms of three themes: the nature and scope of information literacy, the value of information literacy, and effective methods of information literacy skills instruction.

Research efforts in information literacy have yielded a number of useful insights for teachers and librarians and have helped us understand how

Figure 3.1 Comparison of Information Skills Process Models (Adapted from Eisenberg & Brown [1992])


Kuhlthau
Information Seeking
1. Initiation
2. Selection
4. Formulation (of focus)
3. Exploration (investig info on the general topic)
5. Collection (gather info on the focused topic)
6. Presentation
7. Assessment (of outcome/ process)
Eisenberg/Berkowitz
Information Problem-Solving
(The Big6 Skills)
1. Task Definition
1.1 Define the problem
1.2 Identify info requirements
2. Information Seeking Strategies
2.1 Determine range sources
2.2 Prioritize sources
3. Location & Access
3.1 Locate sources
3.2 Find info
4. Information Use
4.1 Engage (read, view, etc)
4.2 Extract info
5. Synthesis
5.1 Organize
5.2 Present
6. Evaluation
6.1 Judge the product
6.2 Judge the process

students look for, use, and present information. Research has validated models that define information literacy and outline the information seeking process, and has demonstrated some of the benefits of these models.

Irving Information Skills	**Pitts/Stripling Research Process**	**New South Wales Information Process**
1. Formulation/analysis of information need	1. Choose a broad topic 2. Get an overview of the topic 3. Narrow the topic 4. Develop thesis/ purpose statement	Defining
2. Identification /appraisal of likely sources	5. Formulate questions to guide research 6. Plan for research & production	Locating
3. Tracing/locating indiv. resources 4. Examining, selecting, & rejecting indiv resources	7. Find, analyze, evaluate resources	Selecting
5. Interrogating/using individual resources 6. Recording/storing info	8. Evaluate evidence take notes/compile bib	Organizing
7. Interpretation, analysis, synth., and eval. of info 8. Shape, presentation, and communication of info	9. Establish conclusions/ Organize info in outline 10. Create and present final product	Presenting
9. Evaluation of the assignment	(Reflection point — is the paper/project satisfactory)	Assessing

Using Eisenberg and Brown's comparison of information models figure (1992), Figure 3.1, we can examine a comparison of several widely known models of information literacy that have been developed through research and evaluation. This side-by-side view of information literacy models shows that there are many similarities among them. In fact, there is more agreement than disagreement among the models, as is true of information literacy research itself. For example, the driving force behind almost all of the models, and many of the findings, is "process"—the understanding that information skills are not isolated incidents, but rather are connected activities that encompass a way of thinking about and using information.

Three primary research themes pervade the literature and research in the field of information literacy (Eisenberg & Brown, 1992; Eisenberg & Lowe, 1996):

1. The nature and scope of information literacy
2. The value of information literacy
3. Effective methods of information literacy skills instruction.

Research centering on the nature and scope of information literacy examines the information problem-solving process, the research process, and the specific skills within these processes. Research on the effect of information skills on performance in both academic and professional situations demonstrates the value of information literacy skills instruction. Finally, research on teaching information literacy describes the effectiveness of a curriculum-integrated approach.

Examining the Themes

Theme 1: The Nature and Scope of Information Literacy

The nature of the concept itself provides a good starting point for those interested in studying information literacy. One of the great truths about modern society is that "information is everywhere." Information is a pervasive and essential part of our society and our lives. Humans are, at their essence, processors and users of information. This is not a recent development. Humans have always been dependent upon information to help them make decisions and guide their actions. Increases in the sheer volume of information and the complexity of information systems, have come about largely because of advances in information technology and the accelerated rate at which we live our lives. Information literacy is the set of skills and knowledge that not only allows us to find, evaluate, and use the information we need, but perhaps more importantly, allows us to filter out the information we don't need. Information literacy skills are the necessary tools that help us successfully navigate the present and future landscape of information.

Doyle (1994) provided a valuable addition to the body of information literacy research with a Delphi study that led to a definition of information literacy. Doyle organized a diverse panel of experts, primarily drawn from members of the National Forum on Information Literacy, and asked them a series of questions concerning a working definition for information literacy. The experts engaged in a reiterative and structured communication process to develop and then fine-tune a definition. After creating an initial list of attributes of information literacy, the experts then ranked the relative importance of the various attributes included in the definition.

When Doyle's Delphi panel reached consensus, they had created both a definition for information literacy, and a group of attributes the information literate person would possess. The definition the group agreed upon was: "Information literacy is the ability to access, evaluate, and use information from a variety of sources" (Doyle, 1992, p. 2). As we saw in Chapter 1, the group also defined ten attributes of an information literate person. By identifying the essential components of information literacy, Doyle's study provides a research-based framework for developing practical applications and for implementing information literacy in curriculum across grade levels and educational situations.

Kuhlthau also contributed to the theoretical foundation of information literacy. Her series of empirical studies leading to theoretical conclusions comprise the most extensive body of work related to information literacy. Kuhlthau's research into the information seeking behavior of students points directly to her philosophy about information literacy—that information literacy is not a discrete set of skills, but rather a way of learning (1993). Kuhlthau concludes that by having students learn to be flexible thinkers and perpetual learners, we prepare them for the new challenges awaiting them in the information age.

Perhaps the most widely publicized model of information literacy is Eisenberg & Berkowitz's Big6™ Skills for Information Problem-Solving model (1988). In their textbook on the Big6, Eisenberg and Berkowitz argue that the Big6 gives students a systematic framework for solving information problems, and that it can be used with students of all levels, from elementary school to corporate training. While the Big6 Skills model was developed largely through experience and reflection, Eisenberg points to Kuhlthau's findings, and the similarities among process models, as research support for the various models including the Big6 (see Eisenberg & Brown, 1992). More recently, Eisenberg has engaged in research to investigate the sufficiency and necessity of the Big6 in solving information problems (Eisenberg & Lowe, 1997). In interviewing participants about their information problem-solving behavior, the researchers found that most people use the Big6 strategy to solve information problems without even knowing it. After they learned the Big6 approach, most participants believed it would be a useful tool for solving future information problems. The study emphasized the importance of using information problem-solving skills across situations.

The New South Wales (NSW, Australia) Information Process model closely matches the Big6 Skills model. The six steps of the NSW Information Process model are: (1) Defining, (2) Locating, (3) Selecting, (4) Organising, (5) Presenting, and (6) Assessing. The New South Wales Department of Education presents the information process as "a philosophical basis and working tool" for planning and teaching information problem-solving skills. The authors believe that this process should include parents and administrators as well as teachers and library media specialists.

The goal of the NSW information process is to develop "successful information users." This goal is achieved by having students develop information skills, and fostering positive information attitudes and values. These are taught in school, and reinforced in family and community settings. The authors of the information process place information skills into two categories: skills concerned with locating information (for instance, finding information in a variety of forms and sources, and then finding information within sources), and skills concerned with understanding and using information (including evaluating information found, synthesizing information, presenting relevant information, among others). By recognizing the skills necessary for successful information problem-solving, and also the positive attitude which makes it possible, the NSW model sends the message that schools should strive to produce well-rounded citizens of the information age.

Stripling and Pitts (1988) created a model of information literacy from the perspective of the school library media field. Having observed that most students who attempted to do research chose the same topics, used the same sources, and ended up with essentially the same products, Stripling and Pitts determined that students were not truly engaged in the research process. In response, they created a ten-step process (1988) that defined various points in the research process where students could stop and reflect. These reflection points emphasize research that is a thinking process requiring the active engagement of the researcher.

Students need to stop and reflect on their research as soon as they begin to choose and narrow a topic. Since students often lack background knowledge to pursue research on their assigned topics, the first steps of the Stripling and Pitts research model are designed to walk students through selecting a topic, gaining an initial overview through research and reading, forming a focus by narrowing the topic, and then researching the narrower topic in depth. This process, which is recursive, is one that is shared by several models of information literacy, including Kuhlthau, Eisenberg and Berkowitz, and New South Wales.

Bruce (1997), an Australia based researcher, offers a unique approach to researching and defining information literacy. Bruce emphasizes the importance of understanding the way the concept of information literacy is conceived by information users themselves. She suggests a "relational" model for information literacy to accompany the "behavioral" models, which she believes, dominate this field of research. The approach that Bruce used for her research is phenomenography; a form of descriptive analysis, that attempts to explain how people conceive of topics such as information literacy. Rather than attempting to seek consensus, as Doyle did in her Delphi study, Bruce's phenomenographic study strived to provide an explanation and description of the differences in the ways people conceive of information literacy.

Bruce's study targeted a group of Australian higher educators. She asked them to describe their conceptions of their own information literacy asking such questions as, "What does information literacy mean to you?" and "Describe your picture of an information literate person." She reported finding seven conceptions of information literacy among her sample of higher educators:

- The information technology conception—information literacy is seen as using information technology for information retrieval and communication.
- The information sources conception—information literacy is seen as finding information.
- The information process conception—information literacy is seen as executing a process.
- The information control conception—information literacy is seen as controlling information.

- The knowledge construction conception—information literacy is seen as building up a personal knowledge base in a new area of interest.
- The knowledge extension conception—information literacy is seen as working with knowledge and personal perspectives adopted in such a way that novel insights are gained.
- The wisdom conception—information literacy is seen as using information wisely for the benefit of others.

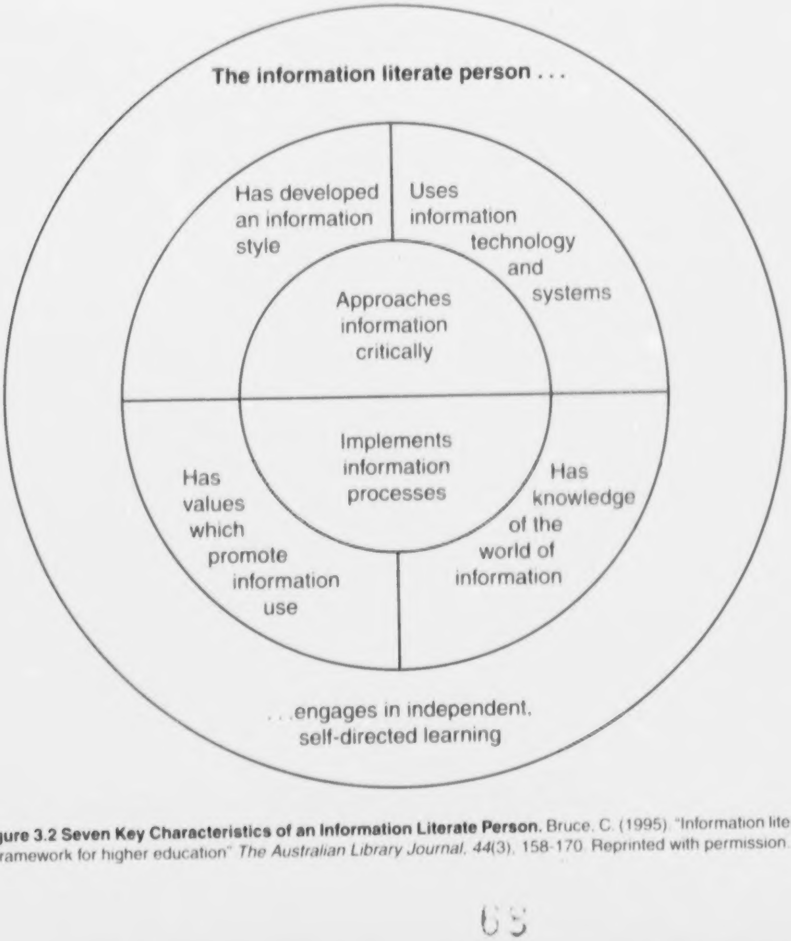

The information literate person . . .
Has developed an information style
Uses information technology and systems
Approaches information critically
Implements information processes
Has values which promote information use
Has knowledge of the world of information
. . .engages in independent, self-directed learning

Figure 3.2 Seven Key Characteristics of an Information Literate Person. Bruce, C. (1995). "Information literacy: A framework for higher education" *The Australian Library Journal, 44*(3), 158-170. Reprinted with permission.

Bruce's work is significant in that it provides insight into what people think information literacy is.

Theme 2: The Value of Information Literacy

As previously noted, Kuhlthau has emerged as a key researcher in establishing the relationship between library and information skills and student success. Some of her most important work has been in the identification and documentation of the affective side of the information process.

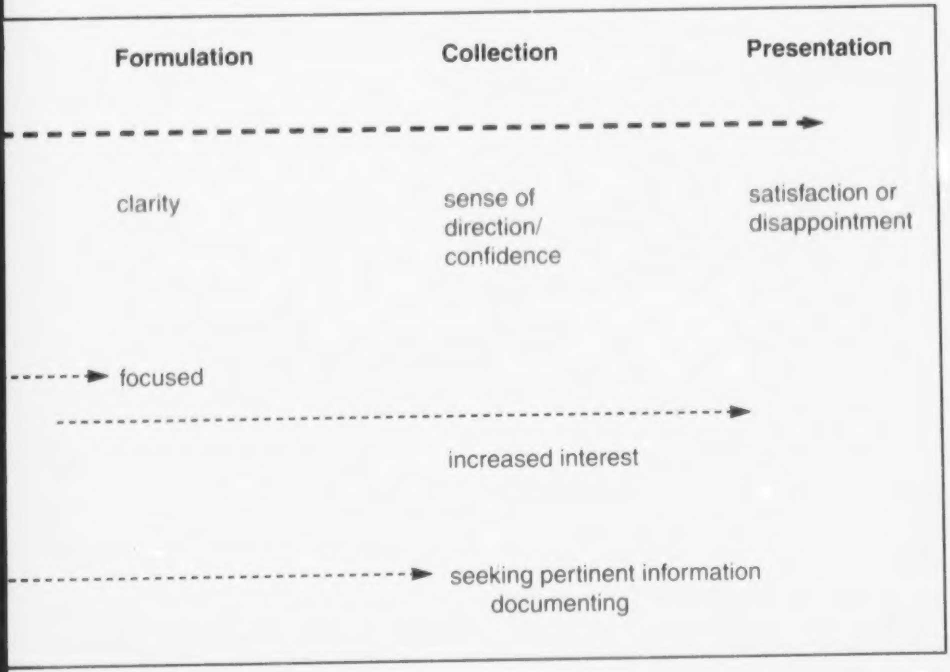
Starting in the mid-1980s, Kuhlthau conducted five research studies on the infor-mation seeking and search behavior of library users (1993). These studies were designed to observe the actions the subjects took to solve their information problems, and also to record the feelings they experienced throughout

Tasks	**Initiation**	**Selection**	**Exploration**
Feelings (affective)	uncertainty	optimism	confusion/ frustration/ doubt
Thoughts (cognitive)	vague		
Actions (physical)	seeking relevant information exploring		

Figure 3.3 The Process of Learning from Information. Kuhlthau, C.C. (1995, Jan). *School Libraries Worldwide, 1*(1), p.5

the process. The first study was a modest qualitative study of 25 high school seniors as they completed a research project. Kuhlthau used various instruments such as learning logs, questionnaires, and short writing assignments to collect data on the students' experiences. She explored the subject at greater length in detailed case studies of six participants. The patterns which emerged from her study prompted Kuhlthau to create a seven-stage Information Seeking model, The Process of Learning From Information (see Figure 3.3).

Early in the information seeking process, students tend to feel anxious and uncertain about what they are doing. This anxiety and uncertainty can be exacerbated by the students' lack of focus in the search process, and their lack of knowledge of technology and information resources. As students continue their research and narrow their focus, this uncertainty gives way to greater


Formulation
Collection
Presentation
clarity
sense of direction/ confidence
satisfaction or disappointment
focused
increased interest
seeking pertinent information
documenting

confidence. When the research is complete and the product is presented, students are left with a feeling of satisfaction or dissatisfaction, depending on their perception of their own success.

Kuhlthau's next two studies focused on a larger group of high school seniors and were conducted to verify the findings from her first study. This group of students represented a more diverse population with different levels of academic achievement. Kuhlthau used process surveys to capture the students' thoughts, feelings, and experiences at three points in the research process. The results of this study showed that information seeking is a process affecting, and being affected by, the feelings of the information seeker. Kuhlthau notes that the study revealed ". . . a process of learning that began with vague thoughts and low confidence, and closed with significant clarification of thoughts and increased confidence" (Kuhlthau, 1993, p. 57). Kulthau provided further verification of her model by conducting another large-scale study of diverse users, this time in public and academic libraries.

Two longitudinal studies of students from the original group of high school seniors confirmed Kuhlthau's model of the information search process. Using the same instrument she had used five years earlier, Kuhlthau surveyed the students about the research process after they had completed four years of college. She found that her original search process model remained applicable for these students. Further evidence of the model was provided by case study analyses of four students.

Kuhlthau's thoughtful and thorough research has given us an important glimpse into students' experiences and feelings throughout the research process. Her research shows that it is especially important that instructors be aware of the anxiety students experience when embarking on research projects. Uncertainty is an important component of information problem-solving, and can compel individuals to engage in information problem-solving activities. However, uncertainty can also cause students to experience a great deal of anxiety.

Pitts' (1995) examination of the mental models of secondary students as they work through information problems also provides valuable insight into the ways students think about information problem-solving. Pitts observed a class of 11th and 12th-graders in a science class as they faced the task of producing a video documentary about marine biology. She learned that when the students began an information problem, they relied on their prior learning to help them solve it. In this situation, Pitts observed that the students used four domains of knowledge: subject matter, information seeking and use, life skills, and video production. When the students faced a problem as part of the assignment (such as not knowing how to locate information in the library), they first categorized the problem in terms of its domain, and then checked for helpful prior learning. If they couldn't find any helpful prior learning, they either "finessed" the problem by using knowledge from another domain, or produced a substandard product using their own inadequate knowledge. In other words, a lack of knowledge in one domain limited learning in another.

Todd's research reinforces Pitts' conclusion that students' limits in information seeking and use skills restrict their acquisition of subject matter understanding. Todd investigated the importance of associating instruction in library and information skills with students' overall success in school. He found that when information and library skills are taught in the context of information problem-solving, and within subject areas, a positive effect on the learning process and on students' attitudes is created. Todd's results found evidence of improvement in test scores, recall, concentration and focus, and reflective thinking (Todd, 1995). These findings provide a compelling argument for including library and information skills instruction both in the library and as part of school-wide curricula.

Irving (1985) was one of the first researchers to highlight how important it is for students to have information skills when they complete classroom assignments. Irving noted that such skills are not just important for students when they are completing schoolwork, but are essential skills that can be used for all aspects of life—academic, professional, and personal. Irving believes that the information retrieval and processing skills, practiced and acquired through the completion of classroom assignments, will transfer to other areas of a student's life.

Irving identifies nine essential steps for successfully solving an information problem:

1. Formulation and analysis of the information need
2. Identification and appraisal of likely sources of information
3. Tracing and locating individual resources
4. Examining, selecting, and rejecting individual resources
5. Interrogating, or using, individual resources
6. Recording and storing information
7. Interpretation, analysis, synthesis and evaluation of information
8. Shape, presentation, and communication of information
9. Evaluation of the assignment.

Although Irving's process is outlined as a series of steps, the steps need not be negotiated in linear fashion. Some steps may be skipped, and some steps may be negotiated more than once.

Goodin (1991) examined the transferability of information literacy skills from high school to college in a study involving two groups of high school students. One group received instruction in library research skills in the context of information literacy, and the other group did not. The students were given pre- and post-tests on college-level library and information skills. The participants in the study wrote research papers that were subsequently evaluated by college-level instructors. Goodin found that the students who received library skills instruction scored significantly higher on the post-test than students who did not receive instruction. She also found that the research papers produced by the high school students who received such instruction were at a level of performance acceptable for college freshmen.

The *Impact of School Library Media Centers on Academic Achievement*, undertaken by Lance, Welborn, and Hamilton-Pennel (1992) for the Colorado Department of Education, is a widely-cited study on the impact of school library media programs on student learning. The study revealed some very important findings. Among these are:

- Where library media programs are better funded, academic achievement is higher, whether their schools and communities are rich or poor and whether adults in the community are well or poorly educated.
- Better funding for library media programs fosters academic achievement by providing students access to more library media staff and larger and more varied collections.
- Among predictors of academic achievement, the size of the library media program staff and collection is second only to the absence of at-risk conditions, particularly poverty and low educational attainment among adults.
- Students whose library media specialists participate in the instructional process are higher academic achievers.

Although Lance et al. do not address the issue of information literacy directly, the findings speak to the importance of the issue in no uncertain terms. A well-run, well-funded library media center has a significant positive impact on student achievement in public schools.

Theme 3: Effective Methods of Information Literacy Skills Instruction
Bibliographic instruction, the teaching of discrete sets of information and searching skills within the library setting, has served traditionally as the classic model for information skills instruction. In an information society, the ability to access, evaluate, and use information will be necessary in all aspects of our lives. As such, educators must provide opportunities for students to learn information skills *throughout* the curriculum. This can be facilitated with the collaboration of teachers and librarians (Eisenberg & Berkowitz, 1988).

Similarly, for higher education, Breivik (1998) advocates collaboration among faculty and academic librarians in the development of a course-integrated approach to information literacy instruction.

Gratch (1992) recognized the importance of information literacy skills in the curriculum, and she and others created a document outlining essential information literacy skills for students in teacher training programs. For information literacy instruction to be truly effective, the skills must be integrated throughout the curriculum. Gratch also emphasizes another principle of information literacy instruction—the need for collaboration among library media specialists and other teachers. Teachers and library media specialists can help students recognize the fact that information literacy skills will help them use information effectively in every area of their lives.

Despite the volume of research on the relative merits of different instructional approaches to information problem-solving skills, no study has ever been able to show one method to be superior over another (Eisenberg & Brown, 1992). What is clear, however, is that students do profit from library and information skills instruction, particularly when those skills are taught in context and across the curriculum (Todd, 1995).

Conclusion—Information Literacy as a New Way of Thinking

Investigations by researchers in the field of information literacy have created an impressive body of research. The ideas represented in that literature are as diverse and creative as the researchers themselves, but there are common themes and ideas throughout.

First, information literacy is a process rather than a discrete set of skills. Doyle's (1994) definition of information literacy articulates this idea, and information problem-solving models such as Kuhlthau's, Eisenberg and Berkowitz's, and Pitts and Stripling's legitimize it. Educators must remember to provide students with opportunities to learn how to find information within sources, and how to evaluate information for credibility and usefulness within the context of the larger information problem-solving process.

Second, information literacy represents a shift in thinking. For students to be successful in the information age, information literacy skills must be integrated throughout the curriculum, as well as reinforced outside of school. The New South Wales model makes this commitment clear, assigning responsibility for helping students develop their information literacy skills not only to teachers and library media specialists, but also to community members. Gratch (1992) concurs by urging teachers to collaborate with library media specialists to create a curriculum that is rich in information literacy concepts.

Finally, information literacy is valuable. The Colorado Department of Education study by Lance et al. (1992) links library media programs that have adequate staff and funding to student success. Goodin's (1991) findings reinforce how important it is for students to have information literacy skills in order to attain success, by concluding that high school students who possess information literacy skills will be more successful in the realm of higher education. Clearly, information literacy is an essential key to student success, both today and in the information society of the future.

Summary

A comparison of information literacy skills models shows that there is more agreement than there is disagreement. Further examination of the studies reveals that there are three common themes throughout:

- Information literacy is a process. Information literacy skills must be taught in the context of the overall process.
- Information literacy skills instruction must be integrated with the curriculum and reinforced both within and outside of the educational setting to be successful.
- Information literacy skills are vital to future success.

chapter 4

An Economic Perspective

Noted author Peter Drucker (1993), management guru, states that although knowledge is taking the place of capital, many people confuse data with knowledge. In other words, people lack the skills to analyze and convert data into knowledge. In this chapter, we will examine the economic ramifications of information literacy and explore the connections of information literacy to the skills of the work place of the future as identified by the Secretary's Commission on Achieving Necessary Skills (SCANS) report.

The nature of information is changing the nature of the world's economy. Haeckel and Nolan (1993) state that codified information and knowledge are replacing capital and energy as the primary wealth-creating assets, just as capital and energy replaced land and labor 200 years ago. The effect of this transformation is that physical laborers are being replaced by knowledge workers—workers who are information literate (see Figure 4.1).

In a knowledge economy, businesses will not succeed based on how well they manage materials or products, but by how well they respond to their customers, to changes in governmental regulations, and to scientific breakthroughs (Ives & Jarvenpaa, 1993). To thrive in this environment, a business must not only use technology to store, retrieve, transfer, manage, and manipulate information, but must also employ information literate workers who will know how to interpret the information and transform it

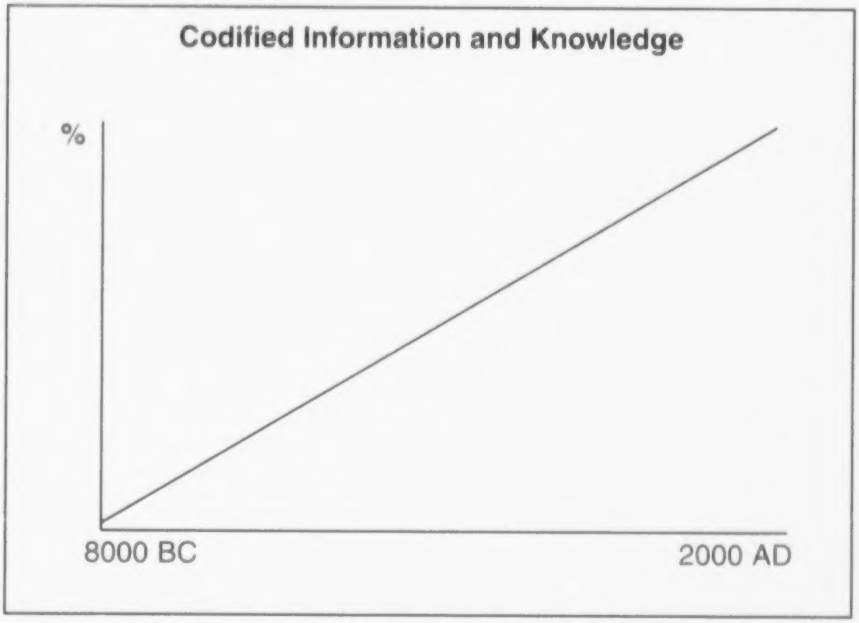
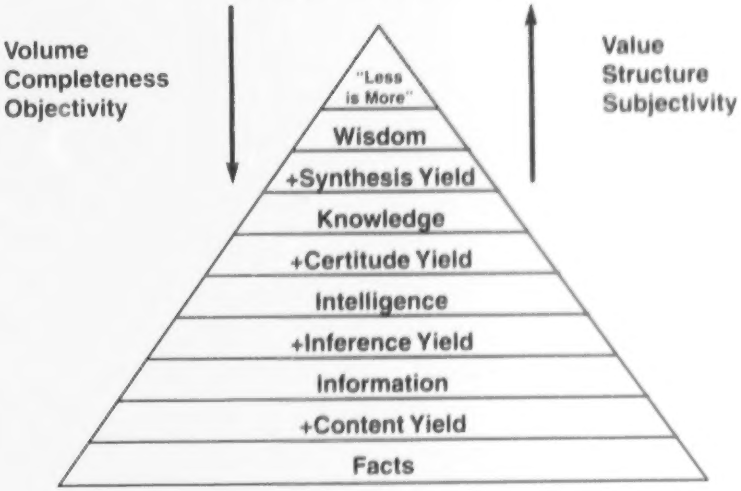


Figure 4.1 Research by Merrifield (in Haeckel and Nolan, 1993) of the Wharton School shows that "90% of the codified information that has been created since the ice age was created in the last 30 years and that this will double in the next 15 years." Reprinted from *The Knowledge Economy* with the permission of the authors.

into knowledge. Such a transformation requires workers to be able to reason and make conjectures based upon prior knowledge (see Figure 4.2).



From Facts to Wisdom

Volume
Completeness
Objectivity
Value
Structure
Subjectivity
"Less is More"
Wisdom
+Synthesis Yield
Knowledge
+Certitude Yield
Intelligence
+Inference Yield
Information
+Content Yield
Facts

Information Hierarchy: An Example

Facts:	Observations with an assumed truth value (e.g., "Sales are down in Pittsburgh and Indianapolis").
Context:	(facts about facts)
Information:	Facts in context (e.g. sales fell off only in the two cities where these four things happened in the same period: we raised prices; a competitor entered with an introductory special offer; the weather was unseasonably cold; and sales of new houses fell off sharply").
Inference:	(reasoning)
Intelligence:	Inference applied to information (e.g., "Multiple linear regression analysis shows that sales volumes are highly correlated with the price differential between us and our nearest competitor").
Certitude:	(conviction - both objectively and subjectively based) .
Knowledge:	Certitude about intelligence (e.g. "Sales fell off in Pittsburgh and Indianapolis because we raised our prices at the same time a competitor entered with an introductory low price. The same thing happened three times in the last four years in other cities").
Synthesis:	(integration of multiple types of knowledge)
Wisdom:	Synthesized knowledge (e.g. "Insist on forecasts of competitive price and promotional actions as a formal part of our pricing process").

Figure 4.2 Excerpted and reprinted from *The Role of Technology in an Information Age: Transforming Symbols Into Action* by Stephen H. Haeckel and Richard L. Nolan. Reprinted with the permission of the authors and of The Institute for Information Studies.

How will the workplace change in the years ahead? To answer this question, Barner (1996) conducted literary research, formed focus groups, and interviewed more than 200 professionals representing diverse industries. He identified seven trends that will transform the workplace:

1. **The Virtual Organization:** the decentralization of the work force
2. **The Just In Time Work Force:** an increase in the number of temporary workers
3. **The Ascendancy of Knowledge Workers:** a shift from producing products to managing information
4. **Computer Coaching and Electronic Monitoring:** an increase in the use of electronic systems for learning, decision making, and performance monitoring
5. **The Growth of Worker Diversity:** the work force will become more multicultural and will include more women
6. **The Aging Work Force:** fewer people will retire early
7. **The Birth of the Dynamic Work Force:** companies will be less stable and more fluid.

Five of these trends that will demand increased information skills are described below:

The Virtual Organization: The growth of technologies and computer networks that allow rapid transfer of voice, video, and data will make it increasingly possible for the work force to access information from decentralized work sites. The instantaneous nature of communication will allow sales representatives to provide customers with up-to-the-minute information about a company's products and services. Barner believes that one implication of this trend is that workers will need to develop their communication and planning skills in order to keep pace with the virtual environment, and the tremendous amount of information available in such an environment.

The Just in Time Work Force: According to Barner, there has been an 240% increase in the number of individuals employed by temporary agencies in the last ten years. These employees need immediate access to information about a company's policies, work procedures, and practices, so that they can contribute to the company's success.

The Ascendancy of Knowledge Workers: As the work force shifts from producing products to managing information, there will be less need for managers who do nothing but manage. Barner notes that such managers will have to contribute technical expertise that will require them to be lifelong learners able to keep pace with technological developments.

The Growth of Worker Diversity: The U. S. Department of Labor predicts that by the year 2000, 85% of the people entering the job market for the first time will be women and minorities. The fact that companies are also setting up more plants in other countries adds to the multicultural nature of the work force. According to Barner, organizations and managers will need information on how to communicate with people from other cultures in order to prevent a cross-cultural communication breakdown.

The Birth of the Dynamic Work Force: A need for continuous improvement will be recognized as companies and organizations become more fluid and less static. A commitment to lifelong learning, and an ability to seek out and identify innovations, will be needed to keep pace with, or outpace, changes.

It is clear that the workplace is being transformed by the knowledge economy and the globalization of industry. The next section will look at a government sponsored commission that was formed to examine the changing nature of the economy and the skills that employees would need to keep pace.

The SCANS Report

Secretary of Labor Elizabeth Dole formed The Secretary's Commission on

Achieving Necessary Skills (SCANS) in 1990 to create a dialogue among workers, parents, and educators to examine the changes taking place in the working world, and to determine the skills needed for employment. During a 12-month span, six panels analyzed jobs in both the private sector and the government. Researchers also conducted in-depth interviews with workers in fifteen diverse occupations. The Commission concluded that due to the global nature of the economy, and the impact of technology, "good jobs will increasingly depend on people who can put knowledge to work" (SCANS, 1991, p. xv).

In comparing the attributes of the traditional work force with the high performance work force needed to ensure success in the future, the Commission noted many differences (see Figure 4.3). In the traditional model, workers who perform the routine tasks of mass production are viewed as a cost. The training needed for such work is minimal and authority is delegated to supervisors. In contrast, the high performance work force that will participate in multi-skilled work teams to envision and carry out flexible and customized production is seen as an investment. To enter such a work force, basic skills and abilities are necessary, and training must be updated on a regular basis.

As a result of the analysis of changes taking place in the work place, the SCANS report suggests and recommends skills that all Americans will need for entry level employment. These recommendations are phrased as outcome measures, and include both foundation skills and practical competencies. The three-part skills foundation includes basic skills, thinking skills, and personal qualities (see Appendix B). The five competencies relate to the management of resources, interpersonal skills, information, systems and technology (see Appendix C).

While information literacy is not explicitly mentioned in the SCANS report, the five competencies mentioned in the report fit well with the comprehensive definition of information literacy. The extension of the three-part foundation beyond reading, writing, and arithmetic into listening/speaking skills and critical thinking skills, including knowing how to learn, imply skills

Characteristics of Today's and Tomorrow's Workplace
SCANS Chart

Traditional Model	High Performance Model
Strategy	
• mass production • long production runs • centralized control	• flexible production • customized production • decentralized control
Production	
• fixed automation • end-of-line quality control • fragmentation of tasks	• flexible automation • on-line quality control • work teams, multi-skilled workers
Hiring and Human Resources	
• labor-management confrontation • minimal qualifications accepted • workers as a cost	• labor-management cooperation • screening for basic skills abilities • workforce as an investment
Job Ladders	
• internal labor market • advancement by seniority	• limited internal labor market • advancement by certified skills
Training	
• minimal for production workers • specialized for craft workers	• training sessions for everyone • broader skills sought

Figure 4.3 "Competing in the New International Economy." Washington: Office of Technology Assessment, 1990.

that are included in the process of information literacy. A direct comparison of the third competency with the expanded definition of information literacy emphasizes the importance of information literate workers (see Figure 4.4).

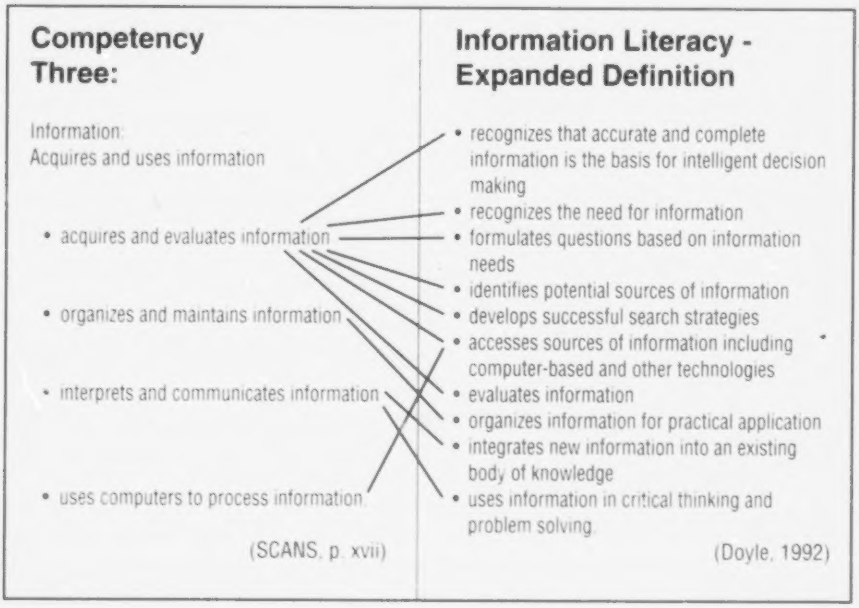

Competency Three:
Information:
Acquires and uses information
• acquires and evaluates information
• organizes and maintains information
• interprets and communicates information
• uses computers to process information
(SCANS, p. xvii)
Information Literacy - Expanded Definition
• recognizes that accurate and complete information is the basis for intelligent decision making
• recognizes the need for information
• formulates questions based on information needs
• identifies potential sources of information
• develops successful search strategies
• accesses sources of information including computer-based and other technologies
• evaluates information
• organizes information for practical application
• integrates new information into an existing body of knowledge
• uses information in critical thinking and problem solving.
(Doyle, 1992)

Figure 4.4 Correlation of SCANS Report Competency Three with the Expanded Definition of Information Literacy

Summary

The change from an economy based on labor and capital to one based on information requires information literate workers who will know how to interpret information. Let's summarize the key points of this chapter:

- Barner's study of the new work place indicates significant changes will take place in the future. Information technology is decentralizing the work place. The work force will be more diverse and the economy will increasingly be more global. The use of temporary workers will increase. These changes will demand that workers possess information literacy skills.

- The SCANS report identifies the skills necessary for the work place of the future. Rather than report to a hierarchical management structure, workers of the future will be required to actively participate in the management of the company and contribute to its success. The work place will demand workers who possess skills beyond those of reading, writing, and arithmetic.

chapter
5

K-12 Education: Information Literacy in the Context of National and State Standards

The SCANS report recognized that the quality of our children's education is linked to the success of our economy. Our nation's governors sought to raise the quality of education with the *Goals 2000: Educate America Act* which outlines eight National Education Goals. This chapter will explore information literacy in the context of the National Educational Goals, content area standards, and state standards that seek to improve our children's education.

In the mid-1950s, the launch of the Russian space satellite, Sputnik, stimulated the refocusing of American educational goals. Schools emphasized the academic and scientific aspects of education, and preparing students for college became a prime national goal. The acquisition of theoretical knowledge by academicians and researchers became valued by society.

As we saw in Chapter 2, *A Nation at Risk* was one of the most publicized top-down efforts to improve education. Other reports followed and states jumped onto educational reform "bandwagons," expending dollars from state income and sales tax revenues. The impetus for these reforms was the need, perceived by state governments, for improved schooling to encourage economic growth (Cuban, 1990).

National Education Goals

A major effort toward improving the nation's education was set into motion by President Bush and the nation's governors in September 1989 at an Education Summit. The state of American education was the focus of the summit's discussion. As a result of the summit, six goals for the improvement of education were outlined. The governors committed their states to the achievement of these goals through restructuring education. President Bush met with the National Governors' Conference in Charlottesville, Virginia in 1990, and together, they publicly announced the National Education Goals. Bill Clinton, who was then governor of Arkansas, led the governors' task force in making the announcement. This marked the second time that national education goals had been established. In 1975, the National Governors' Conference publicized a list of national education goals, but little was done to implement them.

The aim of the National Education Goals was expressed as "individually, to promote higher levels of individual student achievement, and collectively, to build a globally competitive American work force" (*America 2000*, 1991, p. 2). As in the SCANS report, the importance of education to the development of a quality work force was recognized. Six goals were proposed, each having several subgoals that specified the issues to be addressed. Broadly, the six goals covered issues ranging from the education of preschool aged children to adult literacy. The underlying theme was the importance of lifelong learning, with particular emphases placed on schooling and preparation of students.

President Bush's administration created a plan to implement the National Education Goals. On May 22, 1991, President Bush submitted *The America 2000 Excellence in Education Act* to Congress. This proposed bill outlined a number of legislative initiatives to:

- Create and fund exemplary schools
- Reward schools that have made outstanding progress towards the achievement of the National Education Goals
- Focus on teacher training to foster leadership and instructional skills
- Allow parents to make educational choices for their children
- Provide greater authority to the National Assessment of Education Progress to collect data to measure achievement
- Establish Regional Literacy Resource Centers to support the goal that every American be literate by the year 2000 (*America 2000*, 1991).

Congress did not pass *The America 2000 Excellence in Education Act*. Instead Congress initiated the National Council on Education Standards and Testing (NCEST), which recommended that states participate in a voluntary program based on world class standards, and, coupled with assessment systems, to measure student performance.

National Education Goals Passed as Legislation

During the Clinton administration, two additional goals focusing on teacher education and parental participation were added to the six goals that had been announced by President Bush and the nation's governors. The *Goals 2000: Educate America Act* was signed into law on March 31, 1994 by President Clinton. The eight goals as they were incorporated into law are:

Goal 1: School Readiness

By the year 2000, all children in America will start school ready to learn.

Goal 2: School Completion

By the year 2000, the high school graduation rate will increase to at least 90%.

Goal 3: Student Achievement and Citizenship

By the year 2000, all students will leave grades 4, 8, and 12 having demonstrated competency over challenging subject matter including English, mathematics, science, foreign languages, civics and government, economics, arts, history and geography, and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our nation's modern economy.

Goal 4: Teacher Education and Professional Development

By the year 2000, the nation's teaching force will have access to programs for the continued improvement of their professional skills and the opportunity to acquire the knowledge and skills needed to instruct and prepare all American students for the next century.

Goal 5: Mathematics and Science

By the year 2000, United States students will be first in the world in mathematics and science achievement.

Goal 6: Adult Literacy and Lifelong Learning

By the year 2000, every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

Goal 7: Safe, Disciplined, and Alcohol- and Drug-free Schools

By the year 2000, every school in the United States will be free of drugs, violence, and the unauthorized presence of firearms and alcohol and will offer a disciplined environment conducive to learning.

Goal 8: Parental Participation

By the year 2000, every school will promote partnerships that will increase parental involvement and participation in promoting the social, emotional, and academic growth of children (United States Department of Education, 1994, Online).

A Study to Examine the Information Literacy Aspects of the National Education Goals

In 1992, a national panel of experts from the organizational memberships comprising the National Forum for Information Literacy (NFIL) collaborated in a Delphi study that examined the original six National Education Goals. The purpose of the study, was to:

- Analyze the National Education Goals in terms of information literacy
- Create a comprehensive definition of information literacy
- Develop outcome measures for the information literacy concept, and
- Create policy recommendations for each goal for the National Forum on Information Literacy (NFIL).

Through the Delphi study, the National Education Goals were used as a framework to demonstrate the critical nature of information literacy in realizing information society goals.

As a preliminary task, the group rated those education goals that members thought could be attained through information literacy skills. Goals 1, 3, and 6 (formerly 5) were rated well above the others and were the subjects for further consideration. The common theme of all three goals was lifelong learning:

- Children starting school ready to learn (Goal 1)
- Students leaving grades 4, 8, and 12 demonstrating competency with subject matter and able to use their minds well (Goal 3), and
- All adults being literate and equipped with skills necessary to survive in the global economy (Goal 6).

Goal 1 stresses the preschool, formative, and affective aspects of developing a value for information. Goal 3, concerned with schooling, points to the attainment of skills necessary for lifelong learning. Goal 6 addresses the widespread application of skills to employment and citizenship. The study demonstrated that information literacy skills are at the heart of successful attainment of these three goals.

Focus of Each Education Goal

Goal 1

Goal 1 calls for all children to start school ready to learn. The panelists agreed that this might be interpreted as:

- Acquiring skills such as knowing how to learn
- Valuing information, and
- Having a positive and enthusiastic attitude.

Preschool children learn to value information by watching their parents—their first teachers. Other adults, including preschool teachers, are also role models. Children's motivation to read and access information begins with these first role models. Parents need to value information and need to be able to demonstrate to their children effective strategies for accessing, evaluating, and using information. Many parents have yet to acquire these skills, so Goal 5, adult literacy, applies to them as learners. The continuum of lifelong learning is a circle. Adults' need for resources and skills development in turn affects future generations.

Goal 3

Goal 3 is concerned with the way students learn how to use their minds to make informed decisions. During their years of general education (K-12), all students need to learn how to process information as they apply problem-solving and critical thinking skills to their school and personal lives. Learning these skills requires an active learning format where students can process information to meet specific needs at a level that is developmentally

Figure 5.1 Goal 1 of the National Education Goals of 1990

Goal 1. By the year 2000, all children in America will start school ready to learn.

- All disadvantaged and disabled children will have access to high quality and developmentally appropriate preschool programs that help prepare children for school.
- Every parent in America will be a child's first teacher and devote time each day helping their child learn; parents will have access to the training and support they need.
- Children will receive the nutrition and health care needed to arrive at school with healthy minds and bodies, and the number of low weight babies will be significantly reduced through enhanced prenatal health systems. (National Education Goals, 1990, p. 3)

Interpretation of Goal 1 from the Information Literacy Perspective

Parents are a child's first teachers. They provide the most important role models of the value of information to make decisions. In addition, they set an example for motivation to read and to access information.

Policy recommendations for the National Forum on Information Literacy (NFIL).

In order for children to start school ready to learn, a policy must include:

- A national commitment to the access of information for every American
- Community support through library facilities/community services for information rich resources, both print and non-print, and
- Parents' acceptance of their responsibility to develop a value for information by reading to children and discussing what has been read (Doyle, 1992, p. 9-10).

Figure 5.2 Goal 3 of the National Education Goals of 1990

Goal 3. By the year 2000, American students will leave grades 4, 8, and 12 having demonstrated competency over challenging subject matter including English, mathematics, science, history, and geography, and every school in America will ensure that all students learn to use their minds well, so that they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy. (National Education Goals, 1990, p. 3)

Interpretation of Goal 3 from the Information Literacy Perspective

The basic focus of education should be to prepare students to be lifelong learners, to know how to learn. Developing the competencies of information literacy requires an active learning process, which represents a paradigm shift for education.

Policy recommendations for the National Forum on Information Literacy (NFIL).

In order for students to become self-motivated, policy must include:

- National/state governments will make a commitment to ensure all students have equal and regular access to information by assuring adequate resources at each site.
- State Departments of Education/local school systems will develop and implement a resource-based learning curriculum.
- Curriculum standards that reflect a resource-based learning approach will be developed.
- Ongoing inservices will be conducted to ensure that teachers have the skills necessary to facilitate resource-based learning.
- Library/media centers will be recognized as key to successful implementation of resource-based learning.
- Parental support and participation in their children's learning will be considered integral. (Doyle, 1992, pp. 11-13)

appropriate for them. This inquiry approach is basic to active learning. An information rich environment is needed, where many resources are available including computer-based and other technologies. Teachers will need skills of their own to facilitate resource-based learning.

Panel members concluded that teachers are important keys to student attainment of information literacy. Because active learning represents a major shift in instructional strategy, a shift not often addressed in teacher preparation programs, extensive staff development programs for teachers will be needed. Such staff development will need to be ongoing, over a period of years, as teachers build confidence and develop applications suitable for their own classes. Teachers will need to become information literate themselves. They will need to be comfortable with a variety of resources, as well as with the process of accessing, evaluating, and using information. It's also important that assessments be developed that integrate the process of information literacy into meaningful final projects, portfolios, or performances.

A library/media center containing a wide variety of print and non-print resources was identified as being critical to the integration of information literacy into the curriculum. The library/media center should be staffed with a trained library media specialist who collaborates with classroom teachers in carrying out classroom objectives. The library/media center should become the hub of a school, where equity of access to resources is ensured.

Goal 6

Goal 6 focuses on adult literacy and the skills necessary for gainful employment and good citizenship. In terms of information literacy, all Americans need to be lifelong learners, able to access a variety of resources, proficient with various types of technologies, and able to evaluate and use information to meet personal and job-related needs. With more than 80% of American jobs somehow related to services, information has become the most important commodity in the marketplace. Those who can access information will be empowered with the skills necessary to be successful as employees and citizens.

Figure 5.3 Goal 6 of the National Education Goals of 1990

Goal 6. By the year 2000, every adult will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

- Every major American business will be involved in strengthening the connection between education and work.
- All workers will have the opportunity to acquire the knowledge and skill, from basic to highly technical, needed to adapt to emerging new technologies, work methods, and markets through public and private educational vocation, technical, workplace, and other programs.
- The number of quality programs, including those at libraries, that are designed to serve more effectively the needs of the growing number of part-time and mid-career students will increase substantially.
- The proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems will increase substantially. (National Education Goals, 1990, p. 5)

Interpretation of Goal 6 from the Information Literacy Perspective

All Americans need to be lifelong learners.

Policy recommendations for the National Forum on Information Literacy (NFIL).

In order for Americans to be lifelong learners, policy must state that:

- National/state governments will be actively involved in improving the information literacy of citizens.
- Communities will promote lifelong learning.
- Businesses will promote the acquisition of information literacy skills by all.
- All Americans will be able to seek information to solve problems and make informed decisions.
- A wide variety of print and non-print resources will be available to all Americans at no/low cost through public libraries, national online networks, and shared resources with business and public institutions.
- Colleges will recognize that information literacy skills must be mastered by all college graduates (Doyle, 1992, p. 17).

The importance of addressing information literacy at the college level was recognized, although no specific outcome measures were suggested. Several panel members commented that this required immediate attention so that college students could be encouraged to learn and/or reinforce information processing skills.

In this research, the panel members reached consensus on 45 outcome measures for information literacy in the context of selected National Education Goals. These results were in effect, cross validated by the SCANS report discussed earlier. There appears to be a rapid increase in public awareness concerning the need for information literacy skills, although there may not yet be a conscious connection between the concept and the inherent or needed skills.

SCANS and *Goals 2000* are national policy statements, the latter having legal status. Still, it takes more than policy pronouncements to bring about the kind of change that will restructure the American educational system and produce students who are equipped for the Information Age. Both the SCANS report and *Goals 2000* agree on much of what is needed: greater focus on teaching all students to become independent lifelong learners, to become critical thinkers, to use a variety of technologies proficiently, and to work effectively with others. Implicitly, all students must be prepared to use information literacy to solve problems in their personal lives as well as in school and in the workplace. We argue that it is more important for students to know how to find needed information than to try to memorize and store facts for future reference.

National Subject Matter Association Curriculum Standards

Following the passage of the *Goals 2000: Educate America Act*, subject matter organizations were able to obtain funding to develop standards in their respective subject areas. Realizing that subject matter content is ever expanding, professional organizations developed national standards that emphasize a process approach. An analysis of these national standards documents shows that they all focus on lifelong learning, the ability to think critically, and on the use of new and existing information for problem-solving. The sections that follow discuss each subject area standards document in general terms, while Appendix E examines selected specific elements within each document in relation to information literacy skills.

Mathematics Standards

The National Council of Teachers of Mathematics (NCTM) paved the way for all national standards curriculum reform efforts. They published national standards prior to the passage of the *Goals 2000: Educate America Act*. NCTM accomplished its task by asking for input, reaction, and buy-in from the widest possible audience of teachers and practitioners. NCTM also developed a companion document concerning revision of teacher certification.

Curriculum and Evaluation Standards for School Mathematics (1989) views mathematics as "more than a collection of concepts and skills to be mastered; it includes methods of investigating and reasoning, means of communication, and notions of context" (NCTM, p. 5). Information literacy, as presented within this curriculum area, involves problem solving, the use of estimation, thinking strategies for basic facts, formulating and investigating questions from problem situations, and using computers, calculators, and other technologies. Assessment of mathematics also fits within the larger picture of information literacy because the focus of evaluation here is on using information in meaningful ways to demonstrate understanding.

Social Studies Standards

The National Council for Social Studies has published *Expectations of Excellence: Curriculum Standards for Social Studies* which identifies ten standards: culture; time, continuity, and change; people, places, and environments; individual development and identity; individuals, groups, and institutions; power, authority, and governance; production, distribution, and consumption; science technology and society; global connections; and civic ideals and practice. In "Essential Skills for Social Studies," information literacy is integrated with the achievement of the ten standards. Categories of the essential skills include "Skills Related to Acquiring Information," "Skills Related to Organizing and Using Information," and "Skills Related to Interpersonal Relationships and Social Participation" (pp. 148-149). The first two clearly parallel the process of information literacy, and the last relates the importance of information skills and access to information and democracy.

Science Standards

The National Committee on Science Education Standards and Assessment (NCSESA) of the National Research Council first met in May 1992. Attending the meeting were representatives from the National Science Teachers Association, the American Association for the Advancement of Science, American Association of Physics Teachers, American Chemical Society, Council of State Science Supervisors, Earth Science Education Coalition, and the National Association of Biology Teachers. The group decided early on to integrate curriculum, teaching, and assessment standards into a single volume, so that each standard would reinforce the others and produce a solid and complete vision for change.

The science standards include basic understandings of the physical, earth, and life sciences, divided into grade categories K-4, 5-8, and 9-12. Among the eight content standards is "Science as Inquiry" which focuses on students' abilities to conduct scientific experiments and use scientific reasoning and critical thinking skills to analyze results. This is an excellent application of information literacy using a hands-on approach appropriate to a particular subject matter.

The Science and Technology standard requires students to identify a problem or a need to change a current technological design, gather information, generate and evaluate alternative solutions, chose and test solutions, and communicate results orally or in writing as well as through diagrams, models, and demonstrations. This process requires students to use a full range of information literacy skills.

Foreign Language Learning Standards

An eleven-member task force representing a variety of languages, instructional levels, program models, and geographic areas coordinated the development of the foreign language standards. Rather than focusing on the memorization of vocabulary, verb conjugation and grammar rules, the standards for foreign language learning reflect a philosophy that the study of a second language involves ". . . opportunities to explore, develop, and use communication strategies, learning strategies, critical thinking skills and skills in technology, as well as the appropriate elements of the language system and culture" (National Standards in Foreign Language Education Project, 1996, p. 28). The task force identified five broad goal areas: communication, cultures, connections, comparisons, and communities. Within each goal area, two or three content standards are specified, and within these, lists of sample progress indicators for grades 4, 8, and 12 are presented.

Learning a foreign language centers on an understanding of the relationship between culture and communication, and involves the communicative processes of speaking, reading, and writing. Students acquire cultural understanding by studying the perspectives (meaning, attitudes, values, ideas), practices (patterns of social interactions), and products (books, tools, foods, laws, music, games) of the speakers of the native language. The information literacy skills of identifying potential sources of information, accessing sources of information including computer-based and other technologies, organizing information for practical application, integrating new information into an existing body of knowledge, and using information in critical thinking and problem solving are all necessary to the study of a foreign language.

National Geography Standards

Geography for Life: National Geography Standards 1994 identifies six categories of geography skills: the world in spatial terms; places and regions; physical systems; human systems; environment and society; and the uses of geography. Geography helps us to understand the relationships among people, places, and environment. A geographically informed person is able to make sense of not only the local environment (for example, the reasoning behind the location of business establishments in relation to consumers), but also of the global environment (for example, the possible effects of global warming). Knowledge of geography requires the information literacy skills of identifying, using, and analyzing information in a variety of forms (maps, charts, and satellite photos) for the purpose of decision making, and critical thinking.

Increasingly sophisticated geographic information systems (GIS) are used to collect and manipulate data to answer questions and solve problems. Geographic information systems can provide data, but people who are capable of asking the right questions are necessary so that data may be analyzed and interpreted for decision making. Information literacy skills are needed to evaluate information, and use it for critical thinking and problem-solving.

English Language Arts Standards

The development of the *Standards for the English Language Arts* (1996) was co-directed by the International Reading Association, the National Council of Teachers of English, and the Center for Reading at the University of Illinois. There are 12 standards related to literacy growth. Among these 12, several correlate directly with information literacy:

3. Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features.

5. Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g. print and non-print texts artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.

8. Students use a variety of technological and informational resources (e.g., libraries, databases, computer networks, and video) to gather and synthesize information and to create and communicate knowledge (IRA & NCTE, 1996, p. 3).

These four standards correlate very closely with Doyle's definition of information literacy. It is evident that the basic literacy of reading and writing involves the entire range of information literacy skills. In fact, the English Language Arts standards document points out that the definition of literacy has changed greatly. Once defined as the ability to read and write one's own name, the National Literacy Act of 1991 now defines literacy as "an individual's ability to read, write, and speak in English and compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one's goals, and to develop one's knowledge and potential" (IRA & NCTE, 1996, p. 4). As discussed earlier in relation to the SCANS report, the skills needed to function on the job have changed considerably, and information literacy skills are a necessity. •

National History Standards

The *National Standards for History* (1996) connect the knowledge of history with the ability to fully participate in a democratic society and state that:

> . . . knowledge of history is the precondition of political intelligence. Without history, a society shares no common memory of where it has been, of what its core values are, or of what decisions of the past account for present circumstances. Without history, one cannot undertake any sensible inquiry into political, social, or moral issues in

> society. And without historical knowledge and the inquiry it supports, one cannot move to the informed, discriminating citizenship essential to effective participation in the democratic processes of governance and the fulfillment for all our citizens of the nation's democratic ideals (National Center for History in the Schools, 1996, p. 1).

Information literacy skills are essential in order to analyze the past and to make informed decisions about the future.

The standards identify four topics for grades K-4 ranging from living and working together in families and communities, to the history of the United States and the cultures of the world. The standards for grades 5-12 are divided into United States History and World History, and are thematically grouped by eras. The document also identifies five standards of historical thinking: chronological thinking, historical comprehension, historical analysis, historical research capabilities, and historical issues-analysis and decision-making. The standards of historical thinking are interwoven with the outcome measures of the topics and eras.

The standards of historical thinking correlate closely with information literacy. For example, "the ability to interpret data presented in timelines" (p. 15) requires the information literacy skill of evaluating information. To "hypothesize influences of the past" (p. 15), one would have to use information skills in critical thinking and problem-solving. The "formulation of a position or course of action on an issue" (p. 16) implies the need to use a range of information literacy skills including recognizing that accurate and complete information is the basis for intelligent decision making, critical thinking, and problem-solving.

Economics Standards

Economics is one of the nine core subject areas identified by the *Goals 2000: Educate America Act*. The *Voluntary National Content Standards in Economics* (1997) define 20 content standards with benchmarks, so that students will learn basic economics and become productive and informed workers, consumers, savers, investors, and citizens. The standards focus on the practical application of knowledge. For example, content standard 1 states:

> *Students will understand that:*
>
> Productive resources are limited. Therefore, people cannot have all the goods and services they want; as a result, they must choose some things and give up others.
>
> *Students will be able to use this knowledge to:*
>
> Identify what they gain and what they give up when they make choices (National Council on Economic Education, 1997, p. 1).

Benchmark for Grade 12:

> *At the completion of Grade 12, students will use this knowledge to:*
>
> Explain how a high school senior's decision to work 20 hours per week during the school year could reduce her lifetime income. Also, explain how an increase in the legal minimum wage aimed at improving the financial condition of some low-income families could reduce the income of some minimum wage earners (p. 3).

Economic decision-making requires complex thinking skills because the variables involved are interdependent. Students need to use the whole range of information literacy skills to identify needed information, evaluate and analyze information, and use information for critical thinking and problem-solving.

Physical Education Standards

The seven content standards for physical education serve to promote a healthy lifestyle, and encourage physical activity for emotional well-being. The physical education standards address such basics as the development of motor skills, the ability to demonstrate responsible personal and social behavior in physical activity settings, and the ability to include others of diverse physical abilities in group physical activities. The physical education standards emphasize the application of knowledge to the creation of a personal fitness program. Students need to be able to identify the relationship between physical activity and its effect on the body and a healthy lifestyle. The information literacy skills of evaluating information and organizing information for practical application are particularly important for the creation of a personal physical fitness program.

National Health Standards

The National Health Education Standards (1997) define a health-literate person as one who is:

- A critical thinker and problem solver
- A responsible, productive citizen
- A self-directed learner, and
- An effective communicator (Joint Committee on National Health Education Standards, 1997, p. 5).

As critical thinkers and problem solvers, the standards note that health literate individuals can ". . . identify and creatively address health problems and issues at multiple levels, ranging from personal to international. They can utilize a variety of sources to access the current, credible, and applicable information required to make sound health-related decisions" (p. 6). The ability to access and analyze information to make informed decisions about one's health is important particularly as technology and scientific advances present a variety of care and treatment options.

National Arts Education Standards

The National Standards for Arts Education define art as "(1) creative works and the process of producing them, and (2) the whole body of work in the art forms that make up the entire human intellectual and cultural heritage" (Consortium of National Arts Education Associations, 1994, Preface). The arts education standards encompass dance, music, theater, and visual arts, and state that a secondary student should be able to "communicate at a basic level in the four arts disciplines and communicate proficiently in at least one art form, including the ability to define and solve artistic problems with insight, reason, and technical proficiency" (1994, Introduction). The ability to solve artistic problems requires knowledge and understanding of art processes, as well the ability to analyze and evaluate information.

States Recognize the Importance of Information Literacy

The preceding sections show how information literacy fits within the national standards for the content areas. Individual states are now creating initiatives to ensure that students attain information literacy skills by the time they graduate from high school.

California

The California Media and Library Educators Association created a resource for educators seeking information on how to integrate the goals of information literacy into the curriculum. *Library Skills to Information Literacy: A Handbook for the 21st Century* (1994) takes the position that it is the responsibility of educators to prepare students for the challenges they will face in the information age. Although the handbook is based upon several California programs and documents, and was prepared by an educational association that represents that state, it is applicable to educators and curricula nation-wide.

The handbook treats information literacy as a process: "Information literacy has been defined as 'the ability to access, evaluate, and use information from a variety of sources' " (California Media and Library Educators Association, 1994, p. 2). This definition gives the authors a standard upon which to base their model of information literacy. They believe information literacy can be viewed from three perspectives: the searcher's thinking process, the stages of the research process, and instructional strategies. All three of these interdependent components must be addressed in an information literacy curriculum in order to ensure that students will be properly prepared for success in the information age.

The handbook provides concrete examples and strategies to help educators create successful curricula that incorporate information literacy in content area contexts. Library media specialists must work together with teachers to integrate the goals of information literacy into every subject area. The handbook states:

> Library media specialists and classroom teachers have a symbiotic relationship. Teaching students a research process isolated from the curriculum is useless. Similarly, requiring students to perform research without teaching a research process frustrates the students and produces unsuccessful results. Process and content are both necessary for a successful research experience (p. 26).

The handbook provides information for teachers who wish to use an integrated, process-oriented curriculum in the classroom. It defines five steps for creating a fully integrated unit informed by the precepts of information literacy. The document provides specific strategies for each step of the process, and defines roles for teachers, library media specialists, and students in the development and implementation of an information literacy curriculum.

Colorado

Colorado has made great strides in the field of information literacy. As we discussed in Chapter 3, Lance, Wellborn and Hamilton-Pennell's study "The Impact of School Library Media Centers on Student Achievement" firmly established how important a well-funded and professionally staffed library media center is to a student's education. Following the publication of this study, in the summer of 1993, a team of state level personnel, library media specialists, representatives of higher education and public libraries, and content area specialists met at the invitation of Nancy Bolt and the Colorado

State Library. The team sought to establish a philosophical base upon which to build a library media program that would reflect outcomes-based education and school restructuring (Walster, 1995).

Five broad areas for student development were identified and writing teams were assigned. Over a period of a year, the teams created the Model Information Literacy Guidelines (1994) from these five broad areas. The guidelines focus on student outcomes in each of the five following areas:

- Students as knowledge seekers
- Students as quality producers
- Students as self-directed learners
- Students as group contributors
- Students as responsible information users.

Each standard specifies a list of actions that students complete to accomplish the standard. The focus of the guidelines is on student improvement through the integration of processes across content areas.

Funding was obtained to develop and offer statewide training to implement the information literacy guidelines. Throughout 1994-1995, Colorado library media specialists participated in institutes, teleconferences, workshops, and mentoring that resulted in ". . . a majority of media specialists in the state beginning to integrate information literacy guidelines with content-area standards" (Walster, p. 49).

Colorado has also led the way in developing assessment measures for information literacy. The Rubrics for the Assessment of Information Literacy (1996) specify four levels of achievement for each of the five areas of the Model Information Literacy Guidelines (see Chapter 6) and can be used by educators in all content areas.

Kentucky

Kentucky's information literacy initiative, titled *Online II: Essentials of a Model Library Media Program* (1995), was developed in recognition of the importance of information literacy skills in the marketplace of an information-based society. The program emphasizes the vital role of the library media program in developing and promoting these skills, and thus places central importance on the schools' library media program and library media specialist. The Kentucky Department of Education (1995) writes in the handbook to the program:

> One of the national education goals is for all adult Americans to be literate and to possess the knowledge and skills to compete in a global economy. Library media specialists promote information literacy as they help students access, synthesize, produce, and communicate information. This goal is accomplished more effectively when teachers and library media specialists collaborate in providing opportunities for students to think critically (Foreword).

Online II emphasizes the collaboration between library media specialists and teachers. Teachers bring to the classroom their own strengths and areas of expertise. In the case of the library media specialist, this strength is knowledge of information skills and resources. The Kentucky Department of Education believes the strength of a school's library media center and the amount of experience students have with its collection of resources are the best indicators of student success. They write, "Adequate library media facilities, with appropriate resources and professional personnel, are key components to success. The library media program should provide an inviting, accessible and stimulating environment for meeting the information needs of the total school community" (p. 3).

Online II delineates two specific sets of goals for a fully functioning library media program. Under this program, students will:

- Use a variety of library media resources and technologies to locate, organize, and present information relevant to a specific need or problem
- Evaluate, interpret, and select information that meets their needs
- Function as independent learners by using library media resources as well as resources beyond the school site, and
- Pursue areas of personal interest through reading and research in the library media center and beyond (p. 3).

Similarly, the school community will:

- Collaborate with the library media specialist to fully integrate library and information skills instruction into the curriculum
- Consult with the library media specialist about resources required for units of study
- Provide individualized and independent learning opportunities for students through the use of the library media center
- Enhance their personal knowledge and educational expertise by accessing professional information through the library media center, and
- Assess students creatively (pp. 3-4).

Online II outlines strategies schools can employ to improve existing library media programs. It also defines the essentials of an effective library media program. According to *Online II*, an effective library media program uses flexible scheduling, integrates concepts of information literacy throughout the curriculum, provides technology, provides an appropriate learning environment, has adequate staffing, places an emphasis on resources, and has a mechanism in place for governance and management. Accompanying each of these goals are ideas and strategies for library media specialists and administrators to use to implement them in the school. *Online II* also provides baseline strategies and curriculum ideas for teachers and library media specialists to use to create an integrated information literacy curriculum.

Online II is an excellent example of a winning state-wide information literacy curriculum. The goals that it defines are key to educating a generation of information-literate citizens, and perhaps more importantly, the strategies it recommends make the achievement of those goals feasible.

Utah

The Utah State Department of Education developed an information literacy curriculum for secondary schools titled *Library Media/Information Literacy Core Curriculum for Utah Secondary Skills* (1996). The curriculum emphasizes information literacy. Utah recognizes the profusion of information and the importance of information skills to Utah's students' success in school and life.

Similar to the Kentucky *Online II* effort, the *Library Media/Information Literacy Core Curriculum* emphasizes the importance of collaboration. The library media specialist and the classroom teacher need to collaborate in order to create an effective information literacy curriculum. The program defines three roles for the library media specialist within the school: information specialist, curriculum consultant, and teacher. When the library media specialist's role is defined in this way, it is possible for the library media specialist to move beyond the walls of the library, and become a dynamic and important figure—essential to the development of an information literacy curriculum for the school.

The *Library Media/Information Literacy Core Curriculum* specifies the Big6™ Skills approach to information problem-solving (Eisenberg & Berkowitz, 1988) as the structure on which to build an information literacy skills curriculum. The Big6 is a highly useful approach to solving information problems and can be integrated throughout the curriculum. The steps in the Big6 are as follows:

1. Task Definition
2. Information Seeking Strategies
3. Location & Access
4. Use of Information
5. Synthesis
6. Evaluation

According to the *Library Media/Information Literacy Core Curriculum*, "the Big6 Information Problem-Solving Process places the secondary library media/information literacy core curriculum, not in isolation, but as an integral part of all the other subject area core curricula" (Utah State Office of Education, 1996, p. ii).

The Utah State Department of Education states that the mission of the *Utah Library Media/Information Literacy Core Curriculum* is, "to ensure that all students are effective users of ideas and information in all formats" (p. ii). This is enacted through the program's inter-disciplinary approach, which places an emphasis on process, and promotes confidence in students' problem-solving abilities.

The *Utah Library Media/Information Literacy Core Curriculum* provides clear direction and specific strategies for schools wishing to create an effective information literacy curriculum. The Big6 Skills process gives educators an excellent model for the development of curriculum and skills. The curriculum envisioned in this program could also easily be extended to the primary and post-secondary level.

Wisconsin

In 1993, the Wisconsin Educational Media Association (WEMA) released "Information Literacy: A Position Paper on Information Problem-Solving." This document, adopted by the American Association of School Librarians (AASL) in 1994, states that information literacy skills are absolutely necessary for student success in an information economy. The position paper describes what is required to make an information literacy curriculum a reality, outlines information problem-solving skills, argues that resource-based learning provides opportunities for the development of these skills, and suggests that all educators participate in the information literacy process:

> "To become effective information users, students must have frequent opportunities to handle all kinds of information. Locating, interpreting, analyzing, synthesizing, evaluating, and communicating information should become a part of every subject across the curriculum. Resource-based learning calls for all members of the educational community to become partners in a shared goal, providing successful learning experiences for all students. Learning environments should be structured to allow students unlimited access to multiple resources in the classroom, the library media center, and beyond the school walls" (p. 6).

The ideas presented in WEMA's position paper are incorporated in and extended by the State of Wisconsin Department of Public Instruction's Information and Technology Literacy Standards published in 1998. The Information and Technology Literacy Standards document is one of nine standards documents developed by the Department of Public Instruction. The definition of information and technology literacy presented in the standards is both visionary and practical: "Information and Technology Literacy is the ability of an individual, working independently or with others, to use tools, resources, processes, and systems responsibly to access and evaluate information in any medium, and to use that information to solve problems, communicate clearly, make informed decisions and construct new knowledge, products, or systems" (State of Wisconsin Department of Public Instruction, 1998, p. 1). Four content standards are incorporated within the Information and Technology Literacy Standards: Media and Technology, Information and Inquiry, Independent Learning, and The Learning Community. Each contains detailed performance standards students should reach before graduating from grades 4, 8, and 12.

The "Media and Technology" standard states that students must be able to use a variety of technologies to find, organize, and synthesize information. Students will:

- Use common media and technology terminology and equipment
- Identify and use common media formats
- Use a computer and productivity software to organize and create information
- Use a computer and communications software to access and transmit information
- Use media and technology to create and present information
- Evaluate the use of media and technology in a production or presentation (p. 4-5).

Students graduating from high school are expected to have comprehensive experience with a variety of technologies and applications.

The second content standard, "Information and Inquiry," argues that students must be able to "—access, evaluate, and apply information efficiently and effectively from a variety of sources in print, non-print, and electronic formats to meet personal and academic needs" (p. 8). The performance standards associated with "Information and Inquiry" are similar to the steps in the information problem-solving model presented in the WEMA position paper. Students will:

- Define the need for information
- Develop information seeking strategies
- Locate and access information sources
- Evaluate and select information from a variety of print, non-print, and electronic formats
- Record and organize information
- Interpret and use information to solve the problem or answer the question

- Communicate the results of research and inquiry in an appropriate format
- Evaluate the information product and process (pp. 8-9).

"Independent Learning," the third content standard, requires students to use their technology and information skills independently to pursue personal and academic goals. This standard includes characteristics of media literacy and directs students to be discriminating consumers of a variety of media. To demonstrate mastery of the "Independent Learning" standards, students will:

- Pursue information related to various dimensions of personal well-being and academic success
- Appreciate and derive meaning from literature and other creative expressions of information
- Develop competence and selectivity in reading, listening, and viewing
- Demonstrate self-motivation and increasing responsibility for their learning (p. 12).

The final content standard is "The Learning Community." The importance of being able to work as a part of a group and respect intellectual property rights is emphasized. To meet these performance standards, students must:

- Participate productively in workgroups or other collaborative learning environments
- Use information, media, and technology in a responsible manner
- Respect individual property rights
- Recognize the importance of intellectual freedom and access to information in a democratic society (p. 14).

As a whole, these standards give educators a comprehensive guide for providing their students with skills necessary for life in an information society. The Information and Technology Literacy Standards document was distributed to all schools in the state of Wisconsin, along with rubrics, sample lessons, and strategies for integrating information literacy skills into the curriculum. With the publication of the Standards, the State of Wisconsin Department of Public Instruction has shown its dedication to preparing students for the workplace of the future.

Combining Information Literacy and National Content Standards

As we learned in Chapter 4, information literacy skills must not be taught in isolation, but as integral components of the investigative and learning process. Efforts to combine subject area standards with information literacy standards show how this goal may be achieved.

Minnesota's Inquiry Process

Dalbotten (1998) examined the similarities among Minnesota's Inquiry Process, the national content standards of 12 disciplines, and information literacy skills as defined by the Big6™ information problem-solving process. The Inquiry Process, specified as the ability to conduct research and communicate findings, is one component of Minnesota's Graduation Standards in the High Standards section of the Profile of Learning. Minnesota's Inquiry Process involves the ability to:

- Generate questions
- Determine feasibility
- Collect data
- Reduce and organize data
- Display data
- Compile conclusions/more questions (p. 32)

Noting that the national content standards "affirm the shift from learning isolated facts to becoming a self-directed learner who uses inquiry skills throughout life" (p. 48), Dalbotten created a series of charts to cross-correlate the inquiry process with specific components of national content standards (see Appendix F). These charts illustrate that inquiry skills are present within the national content standards of the 12 disciplines. Library media specialists may use these charts to help students transfer the inquiry process from one discipline to another (Dalbotten, 1998).

Oregon Common Curriculum Goals

The Oregon Educational Media Association published draft information literacy guidelines that connect and correlate the Oregon Common Curriculum Goals and the *Information Literacy Standards for Student Learning* developed by AASL and AECT. The guidelines were developed by an Ad hoc committee of the Oregon Educational Media Association. The introduction to the document compares the learning process and the information search process.

> The learning process and the information search process mirror each other: students actively seek to construct meaning from the sources they encounter and to create products that shape and communicate meaning effectively. Core elements in both learning and information theory converge to suggest that developing expertise in accessing, evaluating, and using information is the authentic learning that modern education seeks to promote (Steinke, 1997, Online).

The Ad hoc committee created benchmark statements that relate the library media program to the Oregon Common Curriculum Goals for: English: media and technology, reading, writing and literature. In four areas, science, the social sciences, health education, and the arts, the committee went a step further creating benchmark statements as well as content standards. A draft of the committee's work may be accessed at: *http://www.teleport.com/~oema/infolit_intro.html*

The Information Literacy Guidelines for Scientific Inquiry (see Figure 5.4) demonstrate how these elements can be brought together to create an integrated instructional program.

Figure 5.4 Oregon Educational Media Association (OEMA)
Information Literacy Guidelines
Scientific Inquiry

Common Curriculum Goals	Content Standards	AASL/AECT National Standards
Design and conduct scientific investigations using knowledge of unifying concepts and processes, appropriate tools and techniques.	Use information resources to design and conduct scientific investigations using knowledge of unifying concepts and processes, appropriate tools and techniques.	Access information efficiently and effectively... 1. recognizes the need for information; 2. recognizes that accurate and comprehensive information is the basis for intelligent decision making; 3. formulates questions based on information needs; 4. identifies a variety of potential sources of information; 5. develops and uses successful strategies for locating information. AASL/AECT #1.
Use analysis and interpretation to formulate explanations and draw reasonable conclusions based on the results of an investigation.	Use information resources to formulate explanations and draw reasonable conclusions based on the results of an investigation.	Evaluates information critically and competently. 1. determines accuracy, relevance and comprehensiveness; 2. distinguishes among facts, point of view, and opinion; 3. identifies inaccurate and misleading information; 4. selects information appropriate to the problem or question at hand. AASL/AECT #2
Communicate investigations, explanations and conclusions.	Use information resources to communicate investigations, explanations and conclusions.	Uses information effectively and creatively. 1. organizes information for practical application; 2. integrates new information into one's own knowledge; 3. applies information in critical thinking and problem solving; 4. produces and communicates information and ideas in appropriate formats. AASL/AECT #3
Describe the role of science and technology in local, national and global issues.	Use information resources to understand the role of science and technology in local, national and global issues.	Practices ethical behavior in regard to information and information technology... 1. respects the principles of intellectual freedom; 2. respects intellectual property rights; 3. uses information technology responsibly. AASL/AECT #8

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Summary

National and state efforts are focusing on improving education. With the passage of the *Goals 2000: Educate America Act*, subject matter organizations were able to obtain funding to develop standards in their respective subject areas. Analysis shows that information literacy skills are implicit in the National Education Goals and national content standards documents. Let's summarize the key points:

- The *Goals 2000: Educate America Act*, signed into law on March 31, 1994 by President Clinton, contains eight National Education Goals. Members of the organizations represented in the NFIL formed a panel to participate in a Delphi study that examined these goals in terms of information literacy. The Delphi panel agreed that three of the goals demonstrate the critical nature of information literacy to our information society: Goal 1: School Readiness; Goal 3: Student Achievement and Citizenship; and Goal 6: Adult Literacy and Lifelong Learning.

- An analysis of national content standards documents reveals that they all focus on lifelong learning, the ability to think critically, and on the use of new and existing information for problem-solving.

- Individual states are creating initiatives to ensure that students attain information literacy skills by the time they graduate from high school. Kentucky's *Online II: Essentials of a Model Library Media Program*, Utah's *Library Media/Information Literacy Core Curriculum for Utah Secondary Skills*, and California's *From Library Skills to Information Literacy: A Handbook for the 21st Century* are all examples of what states are doing to focus on the importance information literacy skills for their students.

- National content standards, state standards, and information literacy skills terminology may vary; however all have common components relating to information literacy. Library media specialists and teachers may use these analyses to integrate information literacy skills with subject area instruction.

chapter

6

K-12 Education: Restructuring and Information Literacy

Educational philosophies are shifting to place more emphasis on a process approach to learning. Costa (1993) states "As we abandon traditional views of education, the skills of thinking and problem solving will replace discrete subject areas as the core of the curriculum and will lead to changes in instruction and assessment" (p. 50). In this chapter, we will discuss the relationship between information literacy and the restructuring of K-12 education.

Many educational institutions place emphasis on acquisition and retention of prescribed content and encourage students to work individually to achieve those ends. Unfortunately, this type of learning doesn't always prepare students to transfer and apply knowledge. Gardner (1993) points out that students who learn content through exercises and drills are able to do well on tests by giving correct answers. However, many "A" students fail miserably at applying their knowledge to real problems once they are outside the classroom. Through a restructuring process, educators are now placing emphasis on lifelong learning, on process as well as content, and on cooperative learning. Content is important, but students will ". . . learn *from* the content rather than *of* the content" (Costa, 1993, p. 50).

As a result of restructuring, the roles of the teacher and the learner are shifting. At one time, the teacher was seen as the possessor of knowledge and the students as empty containers to be filled. To prepare students for the challenges of the workplace of the future, teachers are now taking on new roles as facilitators, instructional designers, and collaborative researchers. The teacher is viewed less as the 'sage on the stage' and more as the 'guide on the side.'

To focus on process and learning *from* the content, educators are turning to various forms of resource-based learning: authentic learning, problem-based learning, and work-based learning.

Resource-based Learning

Resource-based *learning* is often confused with resource-based *teaching*. When a teacher selects and uses a variety of resources such as newspapers, magazines, Web sites, or multimedia in addition to the textbook to construct a lesson, the teacher is using resource-based teaching. The students benefit from this approach since their learning experience is enriched beyond the textbook; however, the focus remains on the teacher. In resource-based learning, a variety of resources is also used, but the focus is shifted to the student, and the learner is at the center of the environment. Resource-based learning emphasizes the inquiry approach to learning with the teacher taking on the role of facilitator (Haycock, 1991). Breivik and Senn (1998) further clarify the difference by referring to a 1977 *International Dictionary of Education* definition of resource-based learning as "a learning mode wherein the pupil learns from his own interaction with a range of learning resources rather than from class expository" (p. 12).

For example, a semester long research project is a major requirement of the environmental science course taught at Cicero-North Syracuse High School (Cicero, New York). The class is run in seminar fashion, and students present their research results to the class. Topics are individually selected on the basis of the students' personal interests and are approved by the teacher. The teacher collaborated with library media specialists to develop a rubric for assessing the project. Library media specialists also meet with students on an individual basis throughout the semester to assist them with information literacy skills. The library media specialists

- Help students create and carry out search strategies
- Assist students in assessing whether their information resources are appropriate to the topic
- Suggest additional resources if they are needed
- Help students locate appropriate information within resources, and
- Assist in the creation of multimedia presentations.

Authentic Learning

Students engaged in authentic learning construct meaning through disciplined inquiry, and work toward products or performances that have meaning beyond success in school (Newmann & Wehlage, 1993). Through authentic learning, students address and investigate real world problems or personal situations.

An example of an interdisciplinary authentic learning approach linking biology, U.S. History, and American literature is described by Krovetz et al.

(1993). The interdisciplinary team of teachers who developed the assignment agreed that through authentic learning, all students would be able to:

1. Articulate the purpose of activity
2. Analyze and practice what they do know
3. Acknowledge what they do not know
4. Formulate questions that lead to further knowledge
5. Synthesize connections between knowledge and life experience now and in the future, and
6. Evaluate what was learned, how it was learned, and how it could be more effectively learned as a formal part of the assignment.

An authentic task relating to immigration and genealogy is reprinted in Figure 6.1. Students completing this task use a variety of information literacy skills such as gathering information by interviewing and by observation, synthesizing information, and drawing conclusions.

Schack (1993) provides a less structured example of authentic learning in her description of a personal scenario in an elementary school setting. A student remarked to her teacher that her mother had been feeding the family's house plants with water and gelatin. The teacher wondered out loud if feeding house plants with water and gelatin was advantageous. The student seemed interested in making a determination. Together, the student and teacher brainstormed and decided that a controlled experiment might be a way to find out. The teacher helped the student formulate a research question, (Do rye seeds grow better with plain water, sugar water, salt water, gelatin and water, or no water?), and carry out the experiment. Throughout this process, the student learned information literacy skills:

- Identifying a need for information (Is gelatin advantageous?)
- Determining and accessing a source of information (designing and carrying out the experiment)
- Organizing information (recording the data), and

Figure 6.1 Authentic Task: Immigration and Genealogy

Purpose

1. To learn about the inheritance of specific genetic traits in your family,
2. To learn more about your family's immigration experience,
3. To increase your awareness of and tolerance for unrelated present-day immigrants.

History and Biology Section

Collect as much of the following information as possible:

- Names and relationships to you for as many family members as possible;
- Birth dates and places;
- Dates and locations of mating relationships (married or unmarried);
- Dates, causes, and locations of deaths;
- Nationalities (indicate fractions, if possible);
- Genetic family traits—select two from the list that you can trace through three generations. Select only traits that exist in both dominant and recessive form within your family tree.

History and English Section

Overall directions: Interview a member of your family who is the most knowledgeable and/or charming regarding your family's arrival in the United States. Write your questions ahead of time to elicit the required information. In addition, compose at least five of your own questions, based on the peculiar specifics of your personal situation. Remember, as you interview, to ask good follow-up questions based on the answers given to you. If you submit a taped interview along with your write-up, you will receive extra credit (in both history and English). The evaluation form is due with the assignment.

Required Information from Interview

WHEN: when the first member of your family arrived in the United States (circa OK);
WHO: name(s), age(s), relationship to one another, name changes upon/after arrival;
WHERE: from where they came, where they settled initially and later;
WHY: motivation for leaving native country (for example, hunger, unemployment, persecution. Explore the Push/Pull theory: What forced them to leave, and once they were established here did they pull other family members here as well?);
HOW: method of arrival in United States, how easy/hard the journey was;
EXPECTATIONS vs. REALITY: what differences did they find between their preconceived notions of the United States and reality.

To complete the assignment, you must first finish the interview. You have two options.

Option #1: Based on your interview, create a fictionalized account of the original immigrant experience of your family. This account must include some of the emotions felt by the family member(s) during the immigration experience. If these emotions don't come out in the interview, speculate what they might have been. Make sure you include any challenges or adventures that actually or might have occurred.

Option #2: Make your interview an observational experience. This means you must record the interview because your note-taking will largely focus on observational strategies. These include: complete character description focusing on physical traits, body language, tone of voice, language used, personality quirks; complete description of surrounding environment (show, don't tell); your own feelings (apprehension, excitement, curiosity) before, during, and after the interview. ◇

Dominant Traits	**Recessive Traits**
Dark eyes	Light eyes
Curl tongue	Can't curl tongue
Curly or wavy hair	Straight hair
Right-handed	Left-handed
Type A-B-AB blood	Type O blood
Near- or farsighted	Normal vision
Free earlobes	Attached earlobes
Normal hearing	Deafness from birth
Normal color vision	Color blind
Migraine headaches	No migraines

Krovetz, M., Casterson, D., McKowen, C., & Willis, T. (April, 1993). "Authentic Task Immigration and Genealogy," which appears within the original article "Beyond Show & Tell." *Educational Leadership 50*, 7: 73-76. Reprinted with permission of the Association for Supervision and Curriculum Development. Copyright © 1993 by ASCD. All rights reserved.

- Presenting information (analyzing and interpreting the data and presenting it to her Mom).

The student also learned about treatment and control groups, how to mix and measure solutions, and how to use a graduated cylinder. Because she enlisted the help of another student who acted as a research assistant, she also learned about cooperating and working with others. Perhaps best of all, the student viewed herself as a competent researcher able to find solutions to problems.

Problem-based Learning

Problem-based learning is closely related to authentic learning because the problems posed are real. Problem-based learning was developed by medical educators in the late 1960s and is used in more than 60 medical schools as a replacement for traditional lectures in the first two years of study. It has also been implemented in business schools, schools of education, architecture, law, engineering, social work, and high schools (Barrows, 1996; Savery & Duffy, 1995).

To begin the process, teachers analyze the curriculum and pose a real problem reflective of the content area being taught (see Figure 6.2). For example, students studying Earth Science might be asked "Can global warming be stopped?" This is a real problem and one on which National Oceanic and Atmospheric Administration (NOAA) Scientists are presently working. The problem-based process would proceed as follows:

Figure 6.2 Problem-based Learning Example: Global Warming

Introduction:

To introduce the concept, the teacher shows a short video on global warming.

Discussion: (to propose hypotheses, identify facts, identify learning issues, and propose an action plan)

Following the video, students, in small groups, generate hypotheses based on their prior experiences and knowledge and list any pertinent facts. Students also discuss and identify learning issues—areas where they need to expand their knowledge in order to propose solutions to the problem. Each student has a chance to reflect verbally on the problem and take responsibility for specific learning issues. Students work as a team to develop an action plan. Throughout this process, the teacher acts as a facilitator.

Research and Resource Evaluation:

Students conduct research. They might interview a scientist, consult Web sites, use the library, or contact the National Oceanic and Atmospheric Administration (NOAA). Students meet to evaluate resources and discuss what was useful and what was not. The teacher acts as a consultant.

Problem Reexamination:

Students reexamine their original hypotheses and decide whether they want to change their hypotheses based on the facts they've gathered and learned. They identify additional learning issues and may formulate another action plan. Following this, the research and problem reexamination cycle repeats itself. The teacher acts as a facilitator.

Performance Presentation:

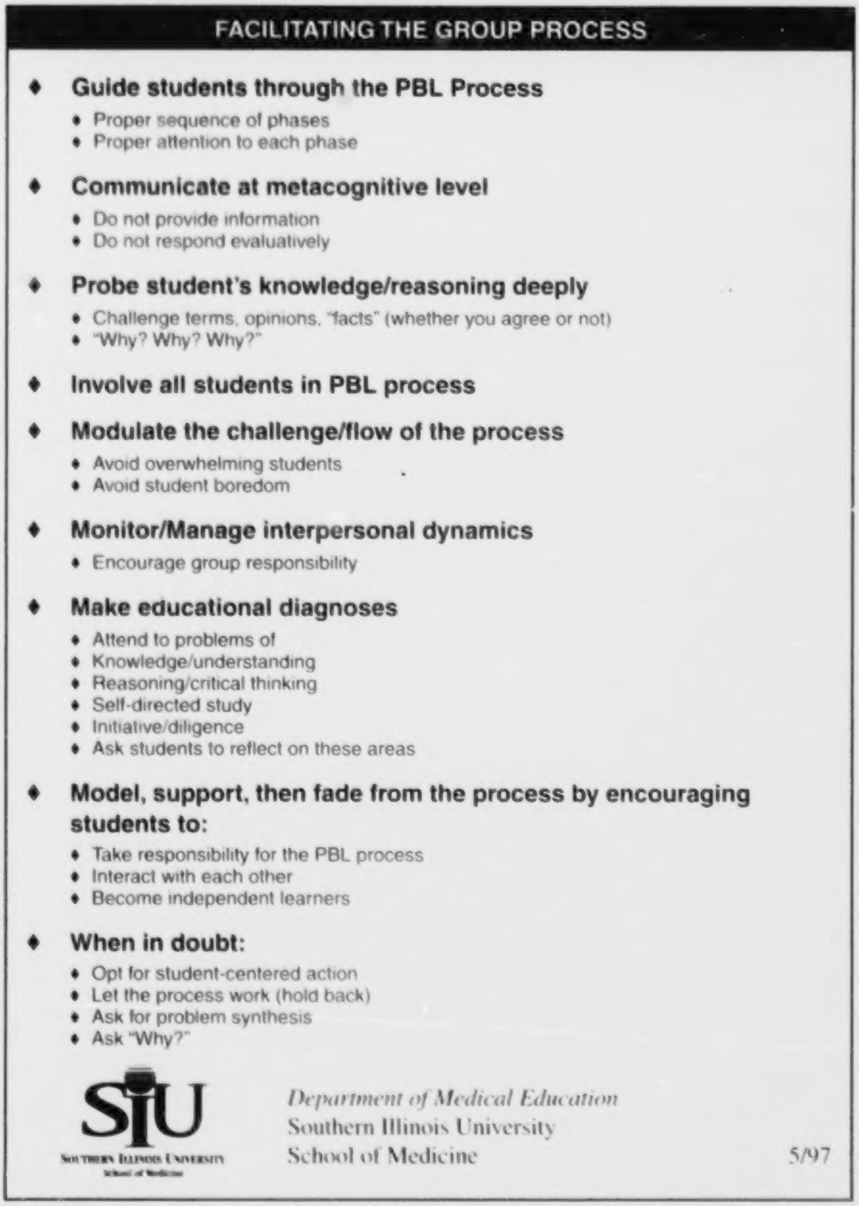
Student teams present possible solutions to the problem to the class. A discussion period follows each presentation. Again, the teacher acts as a facilitator.

Knowledge Abstraction:

Students summarize what they have learned.

Self Assessment:

Students reflect on their reasoning skills, information skills, group process skills, and learning skills.



FACILITATING THE GROUP PROCESS

- **Guide students through the PBL Process**
  - Proper sequence of phases
  - Proper attention to each phase
- **Communicate at metacognitive level**
  - Do not provide information
  - Do not respond evaluatively
- **Probe student's knowledge/reasoning deeply**
  - Challenge terms, opinions, "facts" (whether you agree or not)
  - "Why? Why? Why?"
- **Involve all students in PBL process**
- **Modulate the challenge/flow of the process**
  - Avoid overwhelming students
  - Avoid student boredom
- **Monitor/Manage interpersonal dynamics**
  - Encourage group responsibility
- **Make educational diagnoses**
  - Attend to problems of
  - Knowledge/understanding
  - Reasoning/critical thinking
  - Self-directed study
  - Initiative/diligence
  - Ask students to reflect on these areas
- **Model, support, then fade from the process by encouraging students to:**
  - Take responsibility for the PBL process
  - Interact with each other
  - Become independent learners
- **When in doubt:**
  - Opt for student-centered action
  - Let the process work (hold back)
  - Ask for problem synthesis
  - Ask "Why?"

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Southern Illinois University
School of Medicine

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Figure 6.3 Problem-based Learning Chart Developed by Barrows. Reprinted with the author's permission. Problem-based Learning Institute, Lamphier High School/PBL Laboratory School, 1300 N. 11th Street, Springfield, IL 62702.

BEGINNING

- **Introductions**
- **Climate Setting**
  - Tutor's role/Students' role
  - Open thinking; everyone contributes
  - Silence is assent

STARTING A NEW PROBLEM

- **Encountering the problem**
  - Establish objectives
  - Present the problem situation and assign tasks appropriate to problem format
  - Bring the problem home if necessary
  - Describe the product/performance required
- **Reasoning through the problem**
  - Hypothesis generation/inquiry
  - Analysis/synthesis

Hypotheses	Facts	Learning Issues	Action Plan
Brain-storming about: causation, effect &/or resolution	Syntheses of information obtained through hypotheses guided inquiry	List of what needs to be learned in order to complete the problem task	Things that need to be done in order to complete the problem task

- **Commitment as to probable outcome**
- **Learning Issue shaping and distribution**
- **Resource identification**

SELF-DIRECTED STUDY

PROBLEM FOLLOW-UP

- **Resources used and their critique**
- **A summary of the problem**
- **Reassess the problem**
  - Start with changes needed in hypotheses column

Hypotheses	Problem Information	Learning Issues	Action Plan
Revise in light of new knowledge	Apply new information. Inquire for additional information. Summarize problem and its possible resolution	Identify new (if necessary) or refine old	Actions needed to complete performance/presentation

- **Knowledge abstraction and summary**
  - Articulate definitions, concepts, abstractions, principles
  - Use diagrams, lists, flow charts, concept maps, lists
- **Self- and peer-evaluation**
  - Reasoning through the problem
  - Digging out information using appropriate resources
  - Assisting the group with its tasks
  - Gaining and refining knowledge
- **Tutor and Group Evaluation**

PERFORMANCE PRESENTATION

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The problem-based learning process as developed by Barrows (see Figure 6.3) emphasizes critical thinking, linking old knowledge to new knowledge, application of knowledge, cooperative learning, and information literacy skills. Interestingly, a study has shown that students who learned content through problem-based learning and those who learned content in a more traditional manner, scored equally as well on standardized tests measuring their content acquisition (Gallagher & Stepien, 1996).

Work-based Learning

In an effort to apply academic learning to the real world, a growing number of schools are forming partnerships with businesses. These partnerships are encouraged by the School-to-Work Opportunities Act of 1994. More than simple field trips or informal observation sessions, effective work-based learning programs foster technical competence, an understanding of the nature of work within a larger context, an ability to apply practical knowledge, and a recognition of the value of lifelong learning (Hamilton & Hamilton, 1997). Through structured partnerships with businesses and manufacturers, student apprentices also gain social skills, personal confidence, and an understanding of the expectations of the workplace.

One example of a school to work partnership involved a student at Binghamton (New York) High School and his work site coach at a company called Anitec. As a culminating activity to the student's apprenticeship, the coach gave him an architectural layout for a new silver analysis laboratory and asked him to prepare a functional design package for its electrical services. The following is a summary of the student's project, in terms of information literacy:

> **Identifies needed information and potential sources, develops successful search strategies and accesses sources of information including computer-based and other technologies:**

The student interviewed lab technicians and engineers and read equipment specifications to identify and gather information about power requirements for test equipment, chemical exhaust fans, and general room power and lighting.

Evaluates information and organizes information for practical application:

The student analyzed the gathered information to determine the size of electrical circuits according to the National Electrical Code and to specify the various electrical components needed for the design.

Integrates new information into an existing body of knowledge and uses information in critical thinking and problem solving:

The design package developed by the student included several architectural auto-cad plan-view drawings, schematics, diagrams, a bill of materials, standard construction notes, and a scope of work. Through the project, the student demonstrated his ability to apply knowledge acquired through his apprenticeship and through his regular academic courses (Hamilton & Hamilton, 1997).

Assessment of Information Literacy Skills

The emphasis on a process approach to education requires a concomitant shift in forms of assessment. Instead of completing a teacher-prepared examination requiring rote memorization of facts, students are asked to demonstrate and assess their own learning. Through authentic assessment, students reflect on their own learning, growth, and on the processes by which skills have been achieved. Some of the forms of authentic assessment include portfolios, learning and research logs, and rubrics.

Portfolio Assessment

Portfolios allow students to demonstrate learning and growth over a period of time. The portfolio should be a ". . . deliberate compilation, gathered according to a plan, for use by an identified reader or readers for specific needs or purposes" (Callison, 1993, p. 32). It may contain not only a student's final products or best work, but also may include items that provide evidence of the processes used in the *development* of such items. Gardner refers to these as process-folios and suggests that they contain brainstorming strategies, drafts, critiques, journal entries identifying new understandings, and suggestions for future study (Stripling, 1993). As a starting point for information literacy skills self-assessment, Callison expanded questions originally developed by Marland (see Figure 6.4).

To show evidence of information literacy skills development, the portfolio may include references to, and reflections on, resources that have influenced the student's learning. For example, students working on term papers may incorporate the actual articles they read while researching their papers—including articles that were rejected. Students can reflect on these articles and provide reasons for including some references and excluding others. They can describe the processes they used to identify and gather the resources, and they can reflect on how and what they learned about their information searching skills.

Learning and Research Logs

Reflection allows students to assimilate new information and identify processes that are helpful in completing the task at hand. Learning logs are especially useful in extracting information (Stripling, 1993). When students take notes, they divide their paper into two columns—one column for the actual information they are extracting from the source, and one column for their reflection, reactions, and comments. Students may note their feelings about the information, questions for further research, connections to known information, or comments about usage of that particular information.

A research log may be used to document the processes used in completing a particular project. Students may note their accomplishments, as well as any problems, questions or frustrations they might encounter. The library media

Figure 6.4 Information Literacy Portfolio Questions

What do I need to do?
Demonstrate your ability to:
- analyze the information task;
- analyze the audience's information need or demand;
- describe a plan of operation;
- select important or useful questions and narrow or define the focus of the assignment;
- describe possible issues to be investigated.

Where could I go?
Demonstrate your ability to:
- determine the best initial leads for relevant information;
- determine possible immediate access to background information (gaining the larger picture);
- consider information sources within and beyond the library.

How do I get to the information?
Demonstrate your ability to:
- identify relevant materials;
- sense relationships between information items;
- determine which resources are most likely to be authoritative and reliable;
- consider and state the advantages and disadvantages of bias present in resources;
- consider discovered facts and search for counterfacts;
- consider stated and personal opinions and search for counteropinions;
- determine extent of need for historical perspective.

How shall I use the resources?
Demonstrate your ability to:
- determine if information is pertinent to the topic;
- estimate the adequacy of the information;
- test validity of the information;
- focus on specific issues within the boundaries of the information obtained;
- group data in categories according to appropriate criteria;
- determine the advantages and disadvantages of different information formats and intellectual levels.

Of what should I make a record?
Demonstrate your ability to:
- extract significant ideas and summarize supporting, illustrative details;
- define a systematic method to gather, sort, and retrieve data;
- combine critical concepts into a statement of conclusions;
- restate major ideas of a complex topic in concise form;
- separate a topic into major components according to appropriate criteria;
- sequence information and data in order to emphasize specific arguments or issues.

Have I got the information I need?
Demonstrate your ability to:
- recognize instances in which more than one interpretation of material is valid and necessary;
- demonstrate that the information obtained is relevant to the issues of importance;
- if necessary, state a hypothesis or theme and match evidence to the focused goal of the paper or project;
- reflect, edit, revise, and determine if previous information search and analysis steps should be repeated.

How should I present it?
Demonstrate your ability to:
- place data in tabular form using charts, graphs, or illustrations;
- match illustrations and verbal descriptions for best impact;
- note relationships between or among data, opinions, or other forms of information;
- propose a new plan, create a new system, interpret historical events, and predict likely future happening;
- analyze the background and potential for reception of ideas and arguments of the intended audience;
- communicate orally and in writing to teachers and among peers.

What have I achieved?
Demonstrate your ability to:
- accept and give constructive criticism;
- reflect and revise again;
- describe the most valuable sources of information;
- estimate the adequacy of the information acquired and the need for additional resources;
- state future questions or themes for investigation;
- seek feedback from a variety of audiences.

Adapted and reprinted from: Callison, Daniel. "The Potential for Portfolio Assessment." School Library Media Annual, 1993. Reprinted with the author's permission.

specialist may comment by offering suggestions, giving encouragement, or by asking questions for further exploration.

Rubrics for the Assessment of Information Literacy

Rubrics describe what learners should know and be able to do. Designed in the form of a matrix, rubrics contain target indicators and key behavior skills. Information literacy rubrics were designed by the Colorado State Department of Education (1996) to help educators assess students' progress toward achieving the goals of that state's Model Information Literacy Standards (1994). (See Chapter 5.)

The Colorado *Rubrics for the Assessment of Information Literacy* (see Appendix G) tool allows teachers to identify what their students already know and what they need to learn in several broad areas of information literacy, including the following:

- Constructing meaning from information
- Creating a quality product
- Learning independently
- Participating as a group member
- Using information and information technologies responsibly and ethically.

The benchmarks for these five areas are indicated along with measures for competence (In Progress, Essential, Proficient, Advanced). Educators need not expect that students will achieve advanced proficiency in each and every area. Rubrics are helpful in that they assess students' strengths and weaknesses and identify tangible goals for improvement.

Summary

Educational restructuring makes information literacy skills a necessity as students seek to construct their own knowledge and create their own understandings. Key points in this chapter include:

- Educators are selecting various forms of resource-based learning (authentic learning, problem-based learning, and work-based learning) to help students focus on the process and to help students learn *from* the content. Information literacy skills are necessary components of each.

- The process approach to education is requiring new forms of student assessment. Students demonstrate their skills, assess their own learning, and evaluate the processes by which this learning has been achieved by preparing portfolios, learning and research logs, and using rubrics.

chapter 7

K-12 Education: Information Literacy Efforts

In this chapter, we will provide a number of examples of information literacy efforts in K-12 education. Examples range from those created on a state or regional level to those created by individual library media specialists.

A variety of examples of information literacy efforts in K-12 education are described in the print literature and found on the Internet. These efforts range from state and regional ventures designed to coordinate information literacy standards with the curriculum, to local efforts carried out by individual library media specialists and teachers to integrate information literacy skills with specific lessons or units of study.

Individual districts and library media programs ultimately implement national and state information literacy guidelines. As noted earlier, the Colorado Study (see p. 51) makes it clear that library media programs make a difference in the quality of a student's education. It is up to school districts and individual schools to ensure that their library media programs are adequately funded and staffed to provide information literacy education.

Bellingham Schools

During the 1995-96 school year, teachers at Bellingham Schools (Bellingham, Washington) worked in teams to create experiences that would engage their peers in the same type of integrated learning they hoped to offer their students. Teams selected topics from curriculum guides and designed learning experiences that incorporated technology and higher order thinking skills from Bloom's Taxonomy (Bloom, 1956). One project challenged teachers to use information found on the Internet to select an endangered species, investigate the habitat of the species, and suggest an alternate location where the species might thrive. This lesson, structured with suggestions of Web sites to visit and questions to consider, may be accessed online at: *http://www.bham.wednet.edu/lessons.htm*

In an effort to extend teachers' understandings further, a team of 12 teachers and library media specialists under the leadership of Jamie McKenzie, then director of libraries, media and technology, designed the Bellingham Schools Course Online: Information Literacy and the Net (*http://www.bham.wednet.edu/literacy.htm*) during the fall of 1997. This eight-hour online staff development course incorporates information literacy, visual literacy, textual literacy, and numerical literacy, as well as Gardner's Seven Intelligences as teachers investigate online resources (J. McKenzie, personal communication, March 28, 1998) (see Figure 7.1).

Figure 7.1 Bellingham Schools Course Outline

Bellingham Schools Course Outline: Information Literacy and the Net

This eight hour staff development course emphasizes student investigations as vehicles to explore the information available over the Internet. The course engages participants in learning the **Research Cycle**, several types of literacy, **Gardner's Seven Intelligences** and much more.

This course is primarily about Information Literacy and Information Problem-Solving. Learning to use the software is secondary.

If you would like to download these lessons to use them locally, please contact Jamie McKenzie for permission.

Module 1

Question: What is Information Literacy? How many other literacies exist?

Achievement Targets: Construct a working definition of the concept "information literacy" and gain an overview of class goals and content.

Delivery Strategy: This an opportunity for small group discussion and the introduction of "learning journals" which participants will keep open throughout all the sessions on a word processor.
Go to Module One

Module 2

Question: What is Visual Literacy?

Achievement Targets:
1) Construct a definition of visual literacy
2) Explore some visual resources on the Net
3) Learn to save graphics
4) Learn to navigate: the Back button, the Go menu, the Stop button

continues on next four pages

Delivery Strategy: Visit the Library of Congress site and explore its great collections of photographs, stopping to analyze one photograph in considerable depth. For this lesson go to Visual Literacy

Module 3

Question: What is Textual Literacy?

Achievement Targets:
1) Construct definition of text literacy
2) Explore electronic text resources on the Net
3) Learn more about how to navigate with Netscape: parts of the URL (address)
4) Learn to save text files by copying and pasting text or saving a file to the "H" drive

Delivery Strategy: Participants will visit Project Bartleby at Columbia in order to see how electronic text differs from hard copy. For this lesson go to Textual Literacy

Module 4

Question: What is Numerical Literacy?

Achievement Targets:
1) Construct definition of numerical literacy
2) Explore some numerical resources on the Net
3) Learn how to save and then use datasets with a spreadsheet
4) File Management: anticipating the need for directories

Delivery Strategy: Visit the U.S. Census site and compare two counties in Connecticut using the data found there. For this lesson Go to Numerical Literacy

Module 5

Question: How might we use the Research Cycle to achieve literacy and build insight?

Achievement Targets: Review the steps of the **Research Cycle**.

Delivery Strategy: Readings and (ultimately) a video showing students working through the steps.

For this lesson go to: Research Cycle!

Module 6

Question: In what ways do we gather information?

Achievement Targets: Gather information from the Web in order to make a decision on Which City is Best?

Delivery Strategy: Compare and contrast parks and recreation information about three cities using Mapquest

For this lesson go to: Gathering Information

Module 7

Question: How might we Sort, Analyze and Synthesize Information most effectively?

Achievement Targets: Experience the challenge of creating an answer from the information gathered.

Delivery Strategy: Synthesize findings recorded in Works during Module 6

For this lesson go to: Sorting, Analyzing and Synthesizing Information

Module 8

Question: How do we provide the social foundations and group skills needed to make this kind of research work? How will we measure student progress with literacy?

Achievement Targets: Work with ESL's and various documents for information literacy and assessment throughout the research cycle.

Delivery Strategy: Review and consider use of assessment documents

For this lesson go to: Assessment, Teamwork, and Essential Student Learnings

Module 9

Question: In what ways could this type of learning support multiple intelligences and different learning styles?

Achievement Targets: Brainstorm strategies for different learning styles and intelligences.

Delivery Strategy: Explore a page of definitions outlining and explaining Gardner's **Multiple Intelligences**.

For this lesson go to: Multiple Intelligences

Module 10

Question: Where are the good curriculum resources on the Web and how might I use them?

Achievement Targets: Bookmarks

Delivery Strategy: Visit sites on District Curriculum Pages. Go to Curriculum Page lesson.

Module 11

Question: Where are the good teacher resources on the Web and how might I use them?

Achievement Targets: Bookmarks (continued)

Delivery Strategy: Visit, evaluate and consider the value of teacher sites. Go to Teacher Sites lesson.

Module 12

Question: Where are the good information sites for virtual field trips, weather and daily news? How might I use them?

Achievement Targets: Bookmarks (continued)

Delivery Strategy: Visit, evaluate and consider the value of virtual field trips, weather and daily news sections of the district home page. Go to Real Time Research Resource lesson.

Module 13

Question: Now that I've visited a variety of good sites, how will I use this information to design an effective learning experience for students?

Achievement Targets: Importance of using pre-selected sites

Delivery Strategy: Pick one site that has potential to develop the research cycle, and create a lesson involving an essential question to use with a specific group of students.

Module 14

Question: How do we use indexes and search engines to find information efficiently on the Web?

Go to lesson.

Achievement Targets: Search Engines, Indexes

Delivery Strategy: Participants will test the features of two different search engines in order to see which one returns the best information in the top ten "hits." They will also learn how indexes differ from search engines.

Module 15

Question: How do I connect globally using Telecommunications and Mail?

Achievement Targets: Global activities, Mail

Delivery Strategy: With you and your partner's classroom needs in mind, review five or more activities from each of these groups: Problem Solving Projects, Information Collections, and Interpersonal Exchanges. During the second half of the module, in small groups, explain how you could use the lessons effectively with your students. Internet Projects

Module 16

Question: How does your lesson plan support the district policy?

Achievement Targets: Familiarity with the Bellingham School District Board Policy as it pertains to Internet Policy and Procedures for Students.

Delivery Strategy: Scan the District Policy to see its main components. Relate the policy to lesson plans.

Go to the Policy lesson . . .

Credits: This class was invented by the following Bellingham staff members: Tara Felder, John Schick, Carolyn Hinshaw, Linda Lamb, Eileen Andersen, Dar New, Jamie McKenzie, and Mary Gilson. Return to Bellingham Schools Home Page. Copyright Notice Copyright, 1996, Bellingham Public Schools. All rights reserved. These lessons may be copied by non-profit, public learning institutions only for use with their own staff. If they are used in this manner, proper credit must be given on each page citing the source. All other purposes are expressly prohibited without explicit permission. Revised 10/23/96.

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The course has been extremely successful. In fact, more than 90% of the teachers in the district have participated in it (N. Messmer, personal communication, April 1, 1998).

KidsConnect

KidsConnect, a component of ICONnect, the technology initiative of the American Association of School Librarians (AASL), is an Internet question-answering, help, and referral service for K-12 students. The service is made possible through the efforts of more than 250 volunteer school library media specialists from all over the United States as well as from Australia, Canada, England, Israel, Japan, and New Zealand. When a student sends an e-mail question to KidsConnect (*AskKC@iconnect.syr.edu*), the question is routed to one of the volunteer library media specialists who helps the student through the information literacy process. Sometimes the library media specialists provide a direct answer, but often they provide the student with an example of the metacognitive processes involved in solving their information problem. To date, KidsConnect volunteers have answered more than 12,600 questions from students in 51 different countries (B. Bennett, personal communication, November 29, 1998). A sample question and answer appear below:

(Note: Names have been changed to protect the anonymity of the students.)

> NAME: Todd, Ashley, Tom, Joe and Casey
> GRADE: 3rd
> TOPIC: Worst Pet to have in school
> RESOURCES ALREADY TRIED: Animal books
> ASSIGNMENT: Persuasion paper
> QUESTION: The cost of purchase—Cost of daily feeding—Cost of cage
> We have narrowed our animals down to the Pig, Hippopotamus, Shark (great white), Cow, and Alligator. We want to have the questions above answered about each animal. Thanks for your help.

Dear Todd, Ashley, Tom, Joe and Casey,

Hi! Thank you for your questions. This sounds like a huge project. I can help you put together a strategy for answering your questions and refer you to some Web sites and other resources to help you find more information. When you have any kind of question to answer you can use the six steps below. Altogether they are called the Big6 (you can learn more about them at *http://big6.syr.edu*):

1. ***Task definition: What is your question?***
   You want to know the costs of feeding, purchasing and caging these animals: Pig, Hippopotamus, Shark (great white), Cow, and Alligator.

2. ***Information Seeking Strategies: What kinds of information sources should I use? Which ones are the best to start with?***
   To find out how much it costs to feed the animals, you will first need to find out what they eat. We could probably find that on a Web site, encyclopedia, or book. Then, once you know what they eat, you can contact a feed supply store or another expert to ask about prices.

   To find out how much it costs to purchase cages for each animal, you will probably need to speak with an expert at a zoo.

3. ***Location and Access: How do I find the sources and the information to answer my questions?***
   To find out what the animals eat, I went to an Internet encyclopedia called *Encarta Online <http://encarta.msn.com/EncartaHome.asp>*. You could also use a print or CD-ROM encyclopedia in your library or at home.

   In the search box, I typed "pigs." This brought me to a list of articles. I clicked on "pig" and then was brought to a page that said "see Hog." I clicked on "hog" (another word for pig), and got a whole page of information about the pig including what it eats. This article says that the pig is an omnivore, which means it eats both animals and vegetables.

A book about pigs will give you more specific examples of food pigs eat. Ask your librarian to help you.

Go back to the main *Encarta* page and type in the names of the other animals you are researching to find more information.

Another place to look is Web sites about animals. The Sea World site has good information about animals (mostly marine animals) <*http://www.seaworld.org/infobook.html*>. For information on what sharks eat, see this page: <*http://www.seaworld.org/Sharks/diet.html*>

Electronic Zoo/NetVet is another good Web site about animals. This site can link you to other sites with information on certain animals. Go to the main page at <*http://netvet.wustl.edu/ssi.htm*> and click on the type of animal you want to learn about. This will lead you to a list of links to different sites.

Once you have some basic information, you may want to contact some experts with more specific questions, like about costs and ways to care for the animals:

Here are some animal experts on the Web:
Ask A Keeper from Micke Grove Zoo
http://www.imon.com/mgzoo/pages/ask.htm

Ask Shamu
http://www.seaworld.org/ask%5Fshamu/asintro.html
1-800-23-SHAMU

Ask Jake the Sea Dog (for ocean animals)
Question page: *http://www.whaletimes.org/whaques.htm*
Home page: *http://www.whaletimes.org/whahmpg.htm*

Besides contacting experts through the Internet, you should also check the yellow pages in your local phone book to find veterinarians, zookeepers, aquariums and feed supply stores.

4. ***Use of Information: How do I use the sources (read, listen. . .) and "extract" information from it (take notes, highlight. . .)***
Once you get to a Web site, you can use the source by reading it, looking at pictures, or listening to it if there is sound. If you are contacting an expert, you would use the source by listening to the person talk over the phone or reading an e-mail message (like this one!). While you're listening, reading, looking, etc., you should take notes on what you learn.

5. ***Synthesis: How do I put it all together to show what I learned?***
Once you have all the information you need—costs for owning each animal—you will have to put all the information together. The way you do this depends on your class assignment. It may be a report, chart, poster, etc.

During this step you will also be able to answer a question like "which is the worst pet?"

6. ***Evaluation: How well did I answer my question? What could I do to make it better?***
When you are all done, you can ask yourself these questions. You may need to make some changes to your project if you find you could do something better.

Good luck with your project. Don't forget to ask your librarian to help you find books, Web sites and other materials to help answer your questions. Your librarian can also help you through all of the Big6 steps.

Thank you for writing to KidsConnect!

California Technology Assistance Project - Region VII

The Information Literacy Task Force of Region VII California Technology Assistance Project, encompassing Fresno, King, Madera, Mariposa, Merced, and Tulare Counties, developed information literacy guidelines for grades kindergarten through 12. The introduction to the guidelines states:

> Information literacy is a learning process by which one identifies a need or defines a problem; seeks applicable resources; gathers and consumes information; analyzes and interprets the information; synthesizes and effectively communicates the information to others and evaluates the process.
>
> Information literate people are avid readers and consumers of artistic and cultural information. They are critical and creative thinkers, interested learners, and organized investigators. They use the information responsibly and are effective communicators. They collaborate with others, both in person and through technologies in designing, developing and evaluating information projects or products. As they do so, their skill in using information technology increases.
>
> Information literacy skills are lifelong learning skills which require a student to apply higher level thinking. Information literacy skills are not to be taught in isolation but rather continuously integrated throughout the curriculum. They are most meaningful when taught within an inter-disciplinary unit or within a unit addressing an authentic, real-life need or problem (Online).

The Information Literacy Task Force consisted of a teacher/principal, a teacher, two library media teachers, a library media specialist, and Dr. David Loertscher, of the School of Library and Information Science at San Jose State University. The information literacy model focuses on the investigative process and contains seven categories divided into sub-skills:

- Identifies a need or a problem
- Seeks applicable resources
- Gathers information
- Analyzes information
- Interprets and synthesizes information
- Communicates information
- Evaluates process and product.

A unique element offered by the task force is a chart describing information literacy development (see Figure 7.2 on next page).

The chart helps teachers identify students' information literacy development by comparing the students' characteristics with the chart. Teachers can then use the chart to suggest information sources to the students and use appropriate instructional strategies.

Project SCORE History Social Science

The Schools of California Online Resources for Education (SCORE) provides teachers and students with quality resources on the Web. The SCORE History Social Science site notes:

> A major goal of SCORE History-Social Science is to provide a resource to build the information literacy of students so that they are more able to function as effective workers and citizens in an era when everyone is continuously bombarded by data. Information literacy helps people deal with this data glut by developing the ability to plan a resource-based project, think critically about data, research for

Figure 7.2 California Technology Assistance Project (CTAP)

Information Literacy Development

Student Characteristics	Types of Information Sources	Help and Guidance
Beginner: 1. Has little or no experience using a wide variety of information sources. 2. Requires a great deal of teacher direction and support. 3. Has limited skill in defining, organizing and carrying out a project. 4. Has little experience in analyzing and interpreting information. 5. Lacks critical thinking skills. 6. Developing as an avid reader. 7. Requires skill development in technology tools.	**Beginner:** 1. Guided to a limited number of pre-selected sources. 2. Simple, straight forward, clear and concise, and readily available. 3. Appropriate reading, viewing, listening, and conceptual levels. 4. Format and appearance of information is inviting. 5. Simple searching mechanisms or structure: student can easily find information (one-step lookup).	**Beginner** 1. Conduct mini-lessons about specific sources. 2. Closely monitor students as they encounter information. 3. Introduce information literacy components. 4. Introduce simple presentation models.
Intermediate: 1. Takes on a project with enthusiasm, but topic is often too general. 2. Has experience using a few information sources well. 3. Is easily frustrated as the project develops. 4. Lacks skill in gathering relevant information. 5. Is developing skills of information analysis and interpretation. 6. Is an independent and interested reader. 7. Is developing more independent technology tool skills.	**Intermediate:** 1. Both simple and a few complex information sources are accessible. 2. Complex enough that persistence and skill are required to yield results (may require two-step lookup). 3. The conceptual level of the source requires better reading, viewing, listening and thinking skills. 4. The source may use coding or unfamiliar symbols that must be translated by the user. 5. Number and variety of information sources and technologies are expanding.	**Intermediate:** 1. Ensure access to a variety of resources. 2. Conduct mini-lessons about locating and searching a variety of information sources. 3. Assist students in recognizing and filtering for relevant information. 4. Introduce analysis and interpretation of information. 5. Support and guide students as they encounter information. 6. Help students refocus or expand their thinking as they encounter difficulties. 7. Teach the information literacy components and technology skills. 8. Introduce a wider variety of presentation models.
Advanced: 1. An avid reader. 2. A critical thinker. 3. An interested learner. 4. An organized investigator. 5. An effective communicator. 6. A responsible information user. 7. A skilled user of technology tools.	**Advanced:** 1. Complex and sophisticated information sources are accessible. 2. Contain a variety of view points and perspectives. 3. Persistence in searching exploits the richness of a source. 4. Complex arrangement, format, appearance, or coding is not considered a major barrier. 5. Emphasize primary sources as well as secondary sources. 6. Provide a full range of information technologies.	**Advanced:** 1. Encourage use of the full range of information sources and technologies. 2. Provide more sophisticated searching strategies. 3. Challenge student's critical thinking. 4. Provide feedback as the project progresses. 5. Support the creation of quality and sophisticated presentations.

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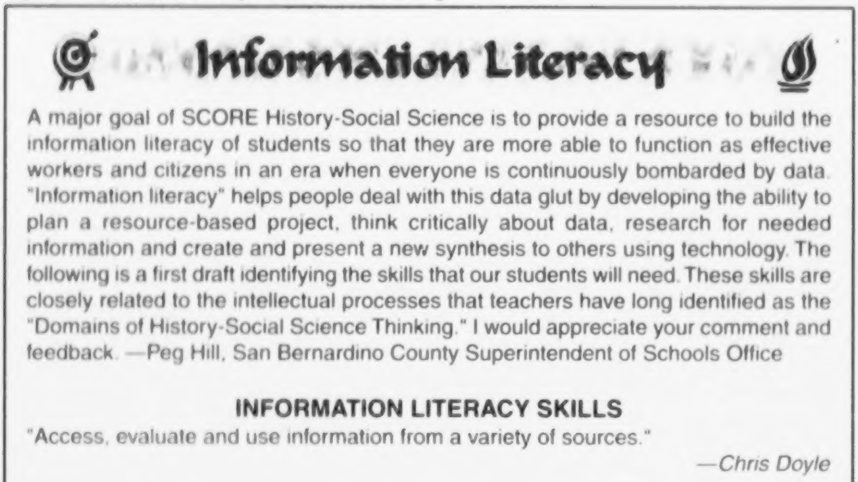
needed information and create and present a new synthesis to others using technology (Online).

The site provides a chart coordinating information literacy skills with the "Domains of History Social Science Thinking" (see Figure 7.3).

Figure 7.3 Domains of History Social Science Thinking



Information Literacy

A major goal of SCORE History-Social Science is to provide a resource to build the information literacy of students so that they are more able to function as effective workers and citizens in an era when everyone is continuously bombarded by data. "Information literacy" helps people deal with this data glut by developing the ability to plan a resource-based project, think critically about data, research for needed information and create and present a new synthesis to others using technology. The following is a first draft identifying the skills that our students will need. These skills are closely related to the intellectual processes that teachers have long identified as the "Domains of History-Social Science Thinking." I would appreciate your comment and feedback. —Peg Hill, San Bernardino County Superintendent of Schools Office

INFORMATION LITERACY SKILLS

"Access, evaluate and use information from a variety of sources."

—*Chris Doyle*

Planning Skills Related to Information Literacy

- Recognizes when there is a need for information to solve a problem or develop an idea
- Formulates questions based on information needs
- Brainstorms multiple strategies for approaching a problem or issue
- Identifies, organizes and sequences tasks to complete an information based project
- Creates and organizes an effective research team
- Identifies tasks which need to be accomplished and assigns them to and manages their completion by various members of the research team

Domains of H/SS Thinking Related to Information Literacy

- Interprets history-social science data
    - Puts data into own words
    - Puts information in context
    - Reads and creates a logical interpretation of data derived from many different kinds of sources, such as media, charts, graphs, timelines, maps, etc.

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- Relates historical events, people and eras
    - Shows similarities and differences
    - Compares and contrasts
    - Draws logical conclusions
    - Relates past to present
    - Uses social, political, economic concepts to understand the context in which information was created or used
- Analyzes cause and effect
    - Puts events in sequence
    - Shows multiple and related causes and effects
    - Distinguishes between correlation and cause and effect in related events
- Uses multiple perspectives
    - Takes the role or position of another and examines issues from that point of view
    - Makes multiple interpretations from the same evidence
    - Points out present assumptions, especially those that were not present in the past
    - Points out social norms of a home culture which are not present in another culture
- Supports a thesis
    - Takes a position or point of view based on evidence
    - Creates a logical argument in writing or speaking supported with relevant evidence

Other Thinking Skills Related to Information Literacy

- Evaluates the quality of information
    - Establishes authority
    - Determines accuracy, authenticity and relevance of information
    - Distinguishes among opinion, reasoned argument and fact
- Analyses messages from various sources for their design, form, structure and sequence
- Identifies the effects of camera angles, lighting, music, special effects, layout and sequence in a presentation
- Creates new information by synthesizing data from primary and secondary sources

Searching/Researching Skills Related to Information Literacy

- Identifies potential sources of information
- Reads competently
- Locates, selects and analyzes information from multiple sources
- Integrates new information to existing knowledge
- Uses keywords effectively to search for information related to a topic
- Uses Boolean logic to narrow a database search
- Organizes and stores data in searchable formats

Presenting Skills Related to Information Literacy

- Knows many different kinds of presentation formats and the type of information they are best at conveying

- Selects a presentation format which matches the information being conveyed and the audience for which it is intended
- Organizes information for practical application
- Uses writing, speaking, drama and layout as needed to make an effective presentation

Resources on the SCORE pages were evaluated by history-social science leaders in California. Going beyond these links allows student access to unknown material. Each school site is responsible for evaluating resources for appropriateness in the local school community.

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According to Peg Hill, SCORE director, lessons and activities on the site ask students to access, evaluate, and use data from the Web to create meaning and support positions on issues. Problem-based lessons are marked with a score target addressing information literacy skills that require students to create and present new knowledge.

Pleasant Ridge School

Library media specialist Marlene Lazzara and teacher Aimee Heinzel at the Pleasant Ridge School (Glenview, Illinois) have created an information literacy adventure that can be integrated with any subject area (available on the Web at *http://prwww.ncook.k12.il.us/LearningCenter/infolit/iladventpage/iladvent.html*). The Web-based adventure, which is charmingly illustrated by Heinzel, uses the metaphor of walking through a forest and climbing a mountain. The site includes:

- **The Forest of Understanding** where students are encouraged to define their task, think about what they already know about the subject by creating a K-W-L chart (What I Need to **K**now, What I **W**ant to Know, and What I **L**earned), and choose an appropriate path for their adventure
- **The Planning Path** where students think about what they need to find out, and brainstorm which sources they might use

- **Carry Out Mountain** where students evaluate, record, and synthesize their information, and create a product
- **Looking Back Peak** where students ask themselves if they have done their best and what they would do differently next time.

This is a wonderful example of a collaborative and imaginative effort between a library media specialist and a teacher in implementing the goal of information literacy.

Northeast Elementary School

Ithaca City School District library media specialists and faculty at Northeast Elementary School (Ithaca, New York) worked during the summer of 1997 to develop draft information literacy performance standards based upon the *Information Literacy Standards for Student Learning* developed by AASL and AECT. Performance indicators were divided into three grade groupings: K-1, 2-3, and 4-5. Strategies for implementing the performance indicators are included. Cynthia LaPier, Director of Information and Instructional Technology, emphasizes that the performance standards are a work in progress and that they will likely undergo a revision process (see Figure 7.4)

Port Hope High School

Teachers on the Curriculum Leadership Team at Port Hope High School (Ontario, Canada) are working on a portfolio system that will allow students to evaluate their information literacy skills. The project team is creating a series of evaluation forms and rubrics that students will be able to access via the Web and send electronically to their teacher. Math teachers at the school are developing a similar skills inventory. (Available at: *http://www.eagle.ca/~spencerj/big6/bg6index.html*).

Forest Creek Elementary School

Students at Forest Creek Elementary School (Round Rock, Texas) engage in Big6™ Skills activities on developmentally appropriate levels (B.Jansen, personal communication, January 25, 1998). The information skills process

Figure 7.4 Information Literacy Standards from Northeast Elementary School, Ithaca, New York

Information Literacy Standards

The following three categories, nine standards, and twenty-nine indicators describe the content and processes related to information that students must master to be considered well educated. The items related to information literacy describe the core learning outcomes that are most obviously related to the services provided by school library media programs. The items related to the other two other areas—independent learning and social responsibility—are grounded in information literacy and describe more general aspects of student learning to which school library media programs also make important contributions.

The latter two categories build upon the first so that, taken together and pursued to the highest levels, the standards and indicators present a profile of the information literate high-school graduate: one who has the ability to use information to acquire both core and advanced knowledge and to become an independent, lifelong learner who contributes responsibly and productively to the learning community. The standards and indicators themselves are written at a level of generality that assumes that individual states, districts, sites, and school personnel must provide the level of detail necessary to apply them across multiple sources and formats of information and to the developmental, cultural, and learning needs of all the students they serve.

Category I: Information Literacy
The student who is information literate:

Standard 1: Accesses information efficiently and effectively, as described by the following indicators:

Performance Indicators	K-1	2-3	4-5	Library Strategies
1. recognizes the need for information	- ask questions - display curiosity	- support assignments - introduce concept: truth	- verification - support "opinion" - intrinsic motivation	- ask questions of students - help students understand library - brainstorm-question setting
2. recognizes that accurate and comprehensive information is the basis for intelligent decision making	- introduce concept: classification	versus movies or TV, computers, newspapers	- DARE - uses career info - demonstrates or gives an example - hypothetical or simulation	- process of decision making - consequences - selecting books for classroom collection - library jobs - Oregon Trail - science experiments example

continues on next two pages

3. formulates questions based on information needs	- asks question with teacher prompting-relies on adult to formulate questions	- global - empirical - why - begins to formulate questions with some coaching	- add more specificity - rephrase questions - identify other subject terms - identify relationships: what	- practice-synonyms —> subject headings - brainstorming questions - keyword searching - phone book searching
4. identifies a variety of potential sources of information	- ask librarian for answer	- ask librarian for help to find information - independence locating information - going from OPAC to shelf - list - mouth - sources	- identify sources —> purpose and strength	- introduce sources - introduce purposes of sources booktalks
5. develops and uses successful strategies for locating information	- go to library or book collection - identify librarian as source - to sections of library	- know sections - favorites - understand sections - use catalog, indexes	- more proficient use of catalog, indexes, electronic tools	- keywords - subjects - parts of library - use indexes, catalogs, etc - Sections - classification understanding - ways to search - author, subject, title

Standard 2: Evaluates information critically and competently, as described by the following indicators:

Performance Indicators	**K-1**	**2-3**	**4-5**	**Library Strategies**
1. determines accuracy, relevance, and comprehensiveness	- recognize source had what was wanted - recognize source information is relevant - knowing fact versus story - knowing illustrations versus photographs	- accuracy - introduce concept - enough information - too general versus specific - recognize what they want is not there	- reject sources - knows format of information presentation - understands why there might be conflicting information	- copyright - dates - presentation of contradictory information - criteria for evaluation - examine author, authority - introduce concept - specific strategies to get to information - table of

				contents, index, headings - production of web page versus book - web site evaluation
2. distinguishes among facts, point of view, and opinion	- vocabulary usage - be a character in a story - introduce concepts	- identify facts - stories - give information as the person, animal, etc. - dress up as person	- historical characters - understand concept Native American versus European - contrasting views - begin to understand how to formulate opinions	- literature selection based on variety of interpretations - fairy tales example - compare and contrast - exposure and awareness - booktalks - reading aloud
3. identifies inaccurate and misleading information	- in relationship to hobbies, favorites	- introduce concept, awareness	- comparison	- compare and contrast - multiple sources - discussion of inaccurate or changes in books
4. selects information appropriate to the problem or question at hand	- uses adult - match, find identification	- use index, table of contents - guided note taking	- paraphrase	- practice using indexes, atlas, thesaurus, almanac, encyclopedia, table of contents, etc.

Standard 3: Uses information effectively and creatively, as described by the following indicators:

Performance Indicators	**K-1**	**2-3**	**4-5**	**Library Strategies**
1. organizes information for practical application	- sort information - uses sets, intersections	- organize notes - maps, webs - worksheets - lists - use given structure - categorize	- develop categories - webs - outlining - understands arrangement of text	- note taking - organizers - how to's

2. integrates new information into one's own knowledge table	- oral sharing - discussions - drawings - writing	- product - cross-reference	- new products - skits, poem - presentations - more independence	- access for new information - task rotation - Elves and Shoemaker scenery example - County postcard example
3. applies information in critical thinking and problem solving	- draw conclusions - hypothesize	- thinking about differences and similarities	- judgements	- country - web sites - what kids need to know - media literacy - Oregon Trail - simulations
4. produces and communicates information and ideas in appropriate formats	- products	- introduce plagiarism	- does not plagiarize	- building web pages - hyperstudio - establish criteria to select product format - display products using books as models - descriptions of models (how to)

Category II: Independent Learning
The student who is an independent learner is information literate and:

Standard 4: Pursues information related to personal interests, as described by the following indicators:

Performance Indicators	**K-1**	**2-3**	**4-5**	**Library Strategies**
- seeks information related to various dimensions of personal well-being, such as career interests, community involvement, health matters, and recreational pursuits	- asks for books about hobbies, personal interests	- uses how-to books - books on human body, family relationships - divorce - magazine articles		- location skills - booktalks - introduce to community resources

- designs, develops, and evaluates information products and solutions related to personal interests	- identifies objects of interest - creates things about families	- understands value of cultural background - tells family stories	- keeps journal	- model - reading aloud - displays - story telling - guest speakers - interviewing

Standard 5: Appreciates and enjoys literature and other creative expressions of information, as described by the following indicators:

Performance Indicators	K-1	2-3	4-5	Library Strategies
1. is a self-motivated reader	- awareness/ recognition of collections by author, topic - asks for books by author - chooses to borrow books - browsing	- asks for books by author, topic, type - self criteria for their ability to read and interest level	- find books independently - reads everything by "author" - experiment with other genre, formats	- location - using catalog - displays - booktalks - helping individuals through reader guidance - reading aloud - author and genre information - book parts - model criteria
2. derives meaning from information presented creatively in a variety of formats	- retell story - no words, based on illustrations - prediction	- tell what book reminds them of - booktalks - write book reviews - understand poetry - readers' theatre		- literature group - drama - booktalks - reading aloud
3. develops creative products in a variety of formats	- attach list plus technology (Book jackets)	- attach list plus technology (Book jackets)	- attach list plus technology (Book jackets)	- models - technology support - criteria to select product
4. assess the quality of the process and products of one's own information seeking	- level of satisfaction	- can identify weaknesses or needs - expresses feelings - asks for feedback	- develops criteria - checklist for process	- develop rubrics with kids - develop criteria for self-assessment

5. devises strategies for revising... and updating... knowledge TABLE				

Standard 6: Strives for excellence in information seeking and knowledge generation, as described by the following indicators:

Performance Indicators	K-1	2-3	4-5	Library Strategies
- assesses the quality of the process and products of one's own information seeking	- level of satisfaction	- can identify weaknesses or needs - expresses feelings - asks for feedback	- develops criteria - checklist for process	- develop rubrics with kids - develop criteria for self-assessment
- devises strategies for revising, improving, and updating self-generated knowledge TABLE				

Category III: Social Responsibility. The student who contributes positively to the learning community and to society is information literate and:

Standard 7: Recognizes the importance of information to a democratic society, as described by the following indicators:

Performance Indicators	K-1	2-3	4-5	Library Strategies
- seeks information from diverse sources, contexts, disciplines, and cultures	- uses adult for selection	- uses sources to support assignments - recognizes diversity		- point of view - selection - collection - booktalks - reading aloud - displays - storytelling

- respects the principle of equitable access to information	- returns books - understands concept of borrowing	- understands sharing - specific authors	- tells others about books and sources - shares information	- borrowing concept - reader guidance - rights of individuals - freedom of speech, censorship, computer usage

Standard 8: Practices ethical behavior in regard to information and information technology, as described by the following indicators:

Performance Indicators	K-1	2-3	4-5	Library Strategies
- respects the principles of intellectual freedom	- respects other's choices		- begins to understand censorship	- discussion - model - read aloud
- respects intellectual property rights	- understands concept of author	- begins to understand copyright - document sources - paraphrase	- documentation more complete - quotations	- copyright - note taking - style manual
- uses information technology responsibly	- is careful with software and hardware	- handles appropriately - share computer time, software	- chooses appropriate software - use of Internet to support curriculum	- netiquette - discussion - site evaluation - software evaluation criteria

Standard 9: Participates effectively in groups to pursue and generate information, as described by the following indicators:

Performance Indicators	K-1	2-3	4-5	Library Strategies
- shares knowledge and information with others	- tells somebody - show and tell	- "teaches" others - presentations - book sharing - recommending reading	- reading aloud	- listening - speaking - questioning - products - booktalks - book reviews - reading aloud

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- respects others' ideas and backgrounds and acknowledges their contributions	- respect and appreciate differences	- positive feedback - encouragement		- biographies - reading aloud - booktalks - multicultural books
- collaborates with others, both in person and through technologies, to identify information problems and to seek their solutions	- works with partners	- team - introduce interlibrary loan - understand technology as communication tool	- understand roles of team - uses interlibrary loan - uses technology to communicate	- e-mail to expert (research) - cooperative learning - videoconferencing - interlibrary loan - interviewing
- collaborates with others, both in person and through technologies, to design, develop, and evaluate information products and solutions	- create books - partner with buddies - storytelling with buddies			- criteria - cross school and cross grade collaboration - videoconference - e-mail - partner storytelling - video production

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is included in the prescribed Round Rock ISD Curriculum Standards. These skills are always integrated into the subject content standards—usually language arts, science, and social studies.

In all grades, the library staff collaborates with teachers to design lesson sequences that are based on the Big6™ steps, beginning with the first level of the process—presenting the Curriculum Standard(s) as an information problem to solve. This provides motivation and rationale for the students to study content and a reason for them to use the Big6 to solve the problem. The librarian and the teachers try to create authentic problems to make the Curriculum Standards relevant to the students' needs and interests.

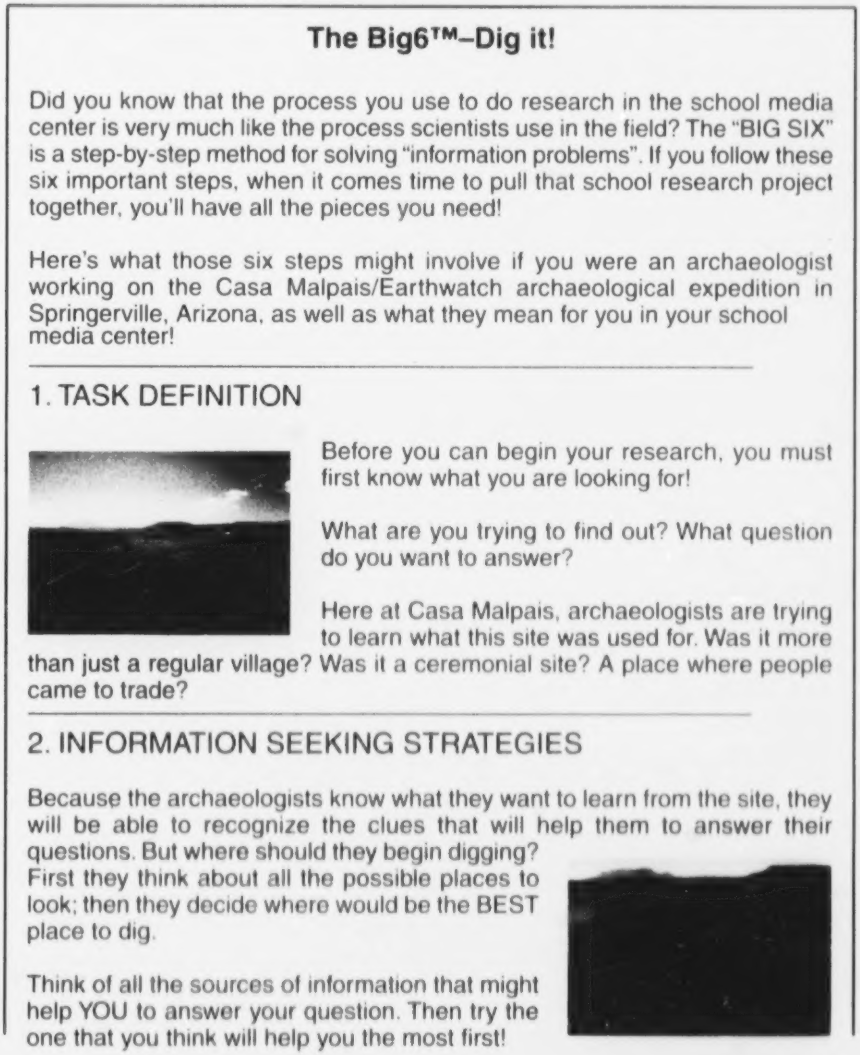
Beginning with kindergarten, the librarian works with the teachers to introduce the Big6 process to students. She uses puppets and a song she wrote to introduce a problem and each of the steps it takes to work through it. The six steps of the Big6 are presented in basic question form for kindergarten through second grade. The sub-skills are not presented in writing, but only in concept, as the teacher introduces the Big6 Skills. Primary sources (observation, survey, and interview) are used as much as possible. Print sources are used when appropriate, but young learners are never required to take notes independently. Note taking is accomplished through the use of Big6 buddies (older student or adults) who help the younger children find and record relevant information, or through note taking triads (adult reading from information source, students critically listening and identifying relevant information, and adult taking relevant notes in words students can understand.) Students are instructed to create developmentally appropriate products that best show results. Self-evaluation takes place beginning with simple peer evaluation in kindergarten and written evaluation begins in the first grade.

Students in grades 3-5 begin defining tasks based on given information problems. The librarian and teachers develop the problem statements, and give the students the opportunity to define the tasks to solve the problems. Very specific instruction is given for using each of the Big6 Skills, including the sub-skills, so those students will learn appropriate strategies to use the Big6 to acquire and use information. Independent use of the Big6 is not required at this grade level, but by the time students are in middle school and high school, they will have internalized the Big6 process enough to be able to use it independently. The use of technology is integrated in each of the Big6 Skills in grades K-5 whenever effective and appropriate and is taught at the point of need.

Mt. Laurel Hartford School

Students at Mt. Laurel Hartford School (Mt. Laurel, New Jersey), and students from anywhere else in the world, can learn about information literacy skills by going to the Big6™–Dig It! Internet Web site developed by Shayne Russell, the school's educational media specialist. Students are asked to think about how they could find information about an archaeological dig, and are taught information literacy skills along the way (see Figure 7.5).

Figure 7.5 The Big6™–Dig it! Web site, Mt. Laurel Hartford School



The Big6™–Dig it!

Did you know that the process you use to do research in the school media center is very much like the process scientists use in the field? The "BIG SIX" is a step-by-step method for solving "information problems". If you follow these six important steps, when it comes time to pull that school research project together, you'll have all the pieces you need!

Here's what those six steps might involve if you were an archaeologist working on the Casa Malpais/Earthwatch archaeological expedition in Springerville, Arizona, as well as what they mean for you in your school media center!

---

1. TASK DEFINITION

Before you can begin your research, you must first know what you are looking for!

What are you trying to find out? What question do you want to answer?

Here at Casa Malpais, archaeologists are trying to learn what this site was used for. Was it more than just a regular village? Was it a ceremonial site? A place where people came to trade?

---

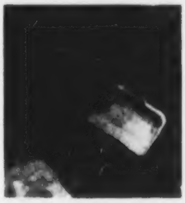
2. INFORMATION SEEKING STRATEGIES

Because the archaeologists know what they want to learn from the site, they will be able to recognize the clues that will help them to answer their questions. But where should they begin digging? First they think about all the possible places to look; then they decide where would be the BEST place to dig.

Think of all the sources of information that might help YOU to answer your question. Then try the one that you think will help you the most first!

3. LOCATION & ACCESS

So far, we've just been thinking about our research. Now it's time to get to work. Archaeologists have special tools they use to get to the information they are looking for—like trowels, brushes, dustpans, buckets, and screens—because their information is usually buried!



You may have to dig for your information, too—but don't bring your trowel to the media center! You'll be using different tools—like MacCatalog, SIRS Discoverer, the Reader's Guide for Young People, and the indexes and tables of contents in books to find your information. Or you might be looking for video tapes, or even people who can answer your questions!

4. USE OF INFORMATION

To find the artifacts that will help them answer their questions, the archaeologists have to sift through a lot of dirt they've removed from the site. While you're doing your research you will also need to be looking, listening, and watching very carefully to find the facts that relate to your question—you'll need to "sift out" a lot of information that isn't relevant or that doesn't help you. This step is where you'll be reading the books or articles you found in step 3 above, or watching video tapes or interviewing people, and deciding which information you can actually use.

Don't forget to keep track of where you found your information! A good archaeologist always carefully records where each artifact was found. Make sure you collect that information, too—you'll need it for your bibliography!

5. SYNTHESIS

Here's the important step where you piece together all the information you've found to see if it answers the question you asked back in step 1! First you'll need to get your information organized. Archaeologists do this by keeping each type of artifact they find in separate bags that are organized according to what room they were found in and where in the room they were found. You might want to use an outline, or a "graphic organizer" (a drawing), or lists to organize the facts you find.

Once you're all organized, you can use your facts to answer the question you asked way back in step #1. Then, you'll need to think about how to present your information so that others can learn from it too. What will your final project

be—a report? a model? a demonstration? Whatever type of presentation you choose, do your very best work!

Lastly, archaeologists label and catalog each artifact they find, so that other scientists will know where each one was found if they want to learn more about it. In a way, you will be doing this too when you write your bibliography. Your bibliography lets people who read (or see, or hear...) your presentation know where you got your information. That way, if they'd like to learn more about your topic, they could go to the same resources you used and read more about it!

---

6. EVALUATION

Our last step is a "thinking" step! Sit back and admire your work and think about what you've done. Are you happy with what you found? The Earthwatch volunteers who found this beautiful Pinedale pot (it's around 700 years old!) sure were!

Think about whether you were able to answer the question you asked back in step 1. What things did you do that were very helpful in finding the answer? Are there things you would do differently the next time you have a research project to do?

If you take the time to evaluate your work, you will become a better researcher (or maybe even... someday... an archaeologist)!

The "Big Six" was developed and copyrighted by Michael B. Eisenberg and Robert E. Berkowitz.

Resources:

Eisenberg, Michael B. and Robert E. Berkowitz. Information Problem-Solving: the Big Six Skills Approach to Library & Information Skills Instruction. Norwood, NJ: Ablex Publishing Co., 1990.

Visit the Big Six Skills website! http://big6.syr.edu/

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The Web pages are an abbreviated version of a 40-minute *Hyperstudio* lesson on the Big6 that can be used to research ancient civilizations of the Southwest. The media specialist wanted the students to know that people in the field were doing original research and making discoveries just as the students do in their research projects. The *Hyperstudio* lesson was a collaborative project among several schools that participated in an Earthwatch expedition to Arizona. Student projects are posted at: *http://www.voicenet.com/~srussell/Casa.html.*

Kindred Public School

Verna LaBounty, the library media specialist at the Kindred Public School (Kindred, North Dakota), serving students in grades K-1, maintains a Big6™ information page on the Internet for students and staff. An explanation of how the Big6 model incorporates technological skills is included on the Web site (available at: *http://www.kindred.k12.nd.us/CyLib/overview.html*). Sample student projects and assignments are listed on the site, including a rain forest portfolio project. For this project, the library media specialist created an assignment guide using the Big6 Skills model as a framework (refer to: http://*www.kindred.k12.nd.us/CyLib/rainf.html*). Students are able to access the assignment guide from home and use the links to find information (see Figure 7.6).

Information Literacy at Home

Parents can foster information literacy at home by helping their children with their homework. However, many parents are frustrated at the prospect of this task. They do not look forward to nagging their children about completing their homework nor do they look forward to their children's complaints. In *Helping with Homework: A Parent's Guide to Information Problem-Solving,* Eisenberg and Berkowitz (1996) present a win-win solution for this age-old problem.

Rather than complete the children's homework for them, or become stuck in the blame-complain cycle, Eisenberg and Berkowitz present a strategy that parents can use to empower their children with information literacy skills. In

Figure 7.6 Rainforest Portfolio Project, Kindred Public School

RAIN FOREST PORTFOLIO

Big 6 #1Task Definition:
Each student will become an expert on an assigned animal that lives in the tropical rain forest.

Information needed:

- Common and scientific name of the animal
- Range or location of the animal
- What animal eats and what eats the animal
- Drawing of the animal and a picture of the animal
- Description of the animal's habitat (canopy, mid- layers, floor, etc.)
- How the animal lives: in groups, alone, etc.
- Is the animal endangered? If so, how can individuals help preserve it?
- Other important information about the animal

Big Six #2 Information-seeking Strategies
Encyclopedias, geographic magazines, non-fiction and picture books on the rain forest, videos, Internet

Big Six #3 Location and Access
LMC, ILL, Internet access in LMC and computer lab LMC Resources:

Vid Rec 333 Rain forest
599 Sch Animals in danger
574.5 Laz Endangered species
574.5 Las The last rain forests
591 M Animals in their worlds
574.5 Ban Conserving rain forests
591.03 Fe Animal encyclopedia for children
599.09 Joh Animals of the tropical forests
574.5 Ham Tropical rain forests

Internet Links
Biome Studies
Rain Forest
Rain Forest Action Network Home Page
Exotic Birds
Local High School Students Study Rain Forest
Sumatran Rain Forests Photos
How to Save the Rain Forest
Olympic National Park

Big Six #4 Use of Information
Note taking
Credit sources

Big Six #5 Synthesis
Decorated folder that contains research notes and finished materials which may be stories, poems, cartoons, t-shirt or button designs, bumper sticker or personalized license plate. Presentation will be in "poster form." One-third of the class will set up stations and the other two-thirds will rotate to each poster station taking notes and asking questions. Then the next third of the class sets up and so forth until all poster stations have been visited.

Big Six #6 Evaluation
Finished assignment fulfills task.

___ Information found matches information needed.
___ Sources credited, even the textbook.
___ Work is neat, accurate, and creative.
___ Work completed by due date and includes name and date.

The Big Six © Eisenberg/Berkowitz, 1990

Reprinted with the author's permission from URL: *http://www.kindred.k12.nd.us/CyLib/rainf.html* their book, the authors state that parents can use the Big6 Information Problem-Solving strategies to help their children by:

- Examining the task
- Trouble-shooting when problems arise
- Brainstorming alternatives
- Reflecting on the finished product. (p. 37)

As we suggested earlier in our chapter on research related to information literacy, reinforcement of such skills at home helps students understand the value of information literacy in their lives.

Summary

In this chapter we provided a number of examples of information literacy efforts created on an individual, local, or regional basis. Through these examples we learned that:

- Imaginative Web based information literacy tutorials can be created and integrated with curriculum areas or can be used for staff development purposes.

- Library media programs can foster information literacy by integrating the presentation of information literacy skills with the curriculum presented at all grade levels.

- Information literacy efforts are not limited to the library field, but are also employed by regional educational consortiums.

- Parents can encourage their students to develop information literacy at home by contacting KidsConnect, the Internet help and referral service for K-12 students. Parents can also help their students work through the information problem-solving process as they assist their children with their homework.

chapter 8

Information Literacy in Higher Education

Shapiro and Hughes (1996) state, "Information literacy should in fact be conceived more broadly as a new liberal art that extends from knowing how to use computers and access information to critical reflection on the nature of information itself, its technical infrastructure, and its social, cultural and even philosophical context and impact as essential to the mental framework of the educated information-age citizen as the trivium of basic liberal arts (grammar, logic and rhetoric) was to the educated person in medieval society" (Online).

Many higher education institutions are in the process of developing information literacy competencies for their students. In this chapter, we will explore the status of information literacy efforts in higher education. We will examine information literacy skills instruction and present examples of information literacy competency development.

Recognizing that students and faculty need to learn to access, evaluate, and use information effectively and efficiently, academic librarians have been offering bibliographic instruction in the form of library orientation, library use instruction, information resources use, and a broad range of information literacy skills for some time. As early as 1880, academic librarians wrote about their role as educators, but the contemporary development of bibliographic instruction is about 25 years old (Farber, 1995). Bibliographic instruction, once concerned with teaching the use of the library itself, has been expanded to include educating users to access, evaluate, and use information from a variety of print and non-print sources both within and outside of the library.

Information Literacy Instruction

A search of the print literature and the Internet reveals that information literacy instruction in higher education can take a variety of forms: stand-alone courses or classes, online tutorials, workbooks, course-related instruction, or course-integrated instruction. Course-integrated instruction differs from course-related instruction in that the information literacy instruction and assignment are built into the course. A number of examples illustrate each form of instruction.

Stand-alone Courses or Classes

Stand-alone courses on information literacy may or may not be credit bearing, and may be in seminar format. Breivik (1998) notes that not all stand-alone courses are successful in outreach because students may not enroll in them if the courses are not required.

New Mexico State University

Information Literacy (LSC 311) is offered at New Mexico State University. The course is designed to develop students' critical thinking and technological skills. Students completing the course participate in electronic and in-class discussions, listen to lectures, and complete hands-on assignments and research projects (Beck, 1998).

University of Wisconsin-Parkside

Students at the University of Wisconsin-Parkside are required fulfill an information literacy requirement either by enrolling in a University seminar, or by completing a self-paced instruction program. An information literacy skills workbook is available online that includes instruction in: using the library catalog, using periodical indexes, citing sources, exploring the Internet, and using reference sources. Skills learned through the seminar are reinforced through class assignments (University of Wisconsin-Parkside, 1997).

Purdue University

The purpose of Purdue University's Information Strategies (GS 175) course is to introduce students to concepts of information retrieval that will be transferable to large computer networks or research libraries. Students learn how to find, analyze, organize, and present information through activities, lectures, homework, and a final project (Brandt, 1998).

Online Tutorials

Academic libraries have developed a number of online tutorials. Tutorials range from the simple to the complex, and focus on issues such as online searching, evaluating Web sites, citing sources, information ethics, and broader information literacy topics.

North Carolina State University

The Library Orientation Basic Orientation (LOBO) developed by North Carolina State University Library is an example of a very extensive and elegantly designed information literacy online tutorial. The tutorial requires students to log in, and keeps track of their progress, so that they do not have to complete all the sessions in one sitting. Guests may also log in. The first session teaches students about the nature of the world of information and how information sources differ in their scope of coverage. Students are guided through two examples of topics that they might investigate, and they are shown the type of information resources that would be best for each example. Students interact with the tutorial by answering questions as they proceed through it. Other components teach students about choosing and searching databases and reading search results (North Carolina State University Library, Online).

Cornell University

The Olin*Kroch*Uris libraries at Cornell University have an Internet Web based tutorial that teaches seven steps to effective library research: identifying and developing a topic, finding background information, using catalogs to find books, using indexes to find periodical articles, finding Internet resources, evaluating information, and citing sources. Students can also electronically access an ask-a-librarian feature (Division of Reference Services, 1997).

James Madison University

Students enrolled in the General Education program at James Madison University are required to meet objectives relating to information seeking and technology skills. To meet these objectives, the Carrier Library reference staff created "Go for the Gold," a Web based tutorial in eight individually accessible modules. Each module contains learning objectives and interactive exercises relating to: the world of information, searching electronic databases, finding information resources, using Internet sources, evaluating information, citing sources, and developing a search strategy (Carrier Library).

University of Louisville

The Office of Information Literacy at the University of Louisville offers Web pages with information literacy links for faculty and students. The faculty page contains links to resources within and outside the university and includes tips for finding and evaluating information on the World Wide Web. The student page teaches students how to use the library, locate resources, use databases, use the Internet, evaluate Internet resources, write a paper, and cite sources (University of Louisville Office on Information Literacy, 1998).

Workbooks

Students at Temple University are required to complete a library skills workbook before starting their second semester. The workbook, aimed at helping students become independent users of information, is available in customized versions for the areas of business, criminal justice, education, humanities, science/technology, and the social sciences. Students are not required to complete any one particular version of the workbook, but are encouraged to complete a version pertaining to their declared major or, if they are undecided, pertaining to an area they might declare as a major (Temple University Libraries, 1997).

Course-related Instruction

The University of California at Berkeley library is typical of many academic libraries. It offers drop-in library research workshops, faculty instruction, Internet training workshops, collaboration with faculty to develop course-integrated assignments, and course related instruction. Using this type of instruction, librarians highlight discipline specific resources related to particular courses (University of California at Berkeley Library, 1997).

Course-integrated Instruction

Many academic library programs are turning to course-integrated instruction to provide users with information literacy skills in the context of actual information needs (Breivik, 1998). This approach makes information literacy skills instruction inherently more meaningful than when such skills are taught out of context.

The University of Arizona

The University of Arizona library has an Internet Web site that showcases a number of models of course-integrated instruction. Projects collaboratively designed by librarians and faculty have been developed for the following areas:

- anthropology
- art education
- arts & sciences
- educational psychology
- English
- French
- geography
- history
- humanities
- library science
- linguistics
- materials science engineering
- political science
- public administration
- teaching and teacher education
- theatre arts
- women's studies.

A page for each project features the names of the developers, the course, the assignments, and the course-integrated information literacy instruction. For example, students in History 436–Civil War and Reconstruction, track three different events in newspapers representing different political viewpoints during the 1860s and 1870s. Students create a portfolio of these articles and share their findings with their class. Librarians teach the students how to locate newspapers of the Civil War era (University of Arizona, Librarian–Faculty Teaching Technology Partnerships, undated, Online).

Florida International University

The Florida International University Library Instruction Program tries to reach every student. Rather than requiring a separate course in information skills, the Library Instruction Program consists of classes linked to the curriculum throughout the university. The Library Certification Program is taught in conjunction with the Freshmen Composition Program and is required for all sections. Students learn about information search strategies and critical thinking. The program has been expanded to build on the foundation of the Library Certification Program. Librarians and faculty members collaborate to design assignments that are integrated into courses in a number of major fields of study including: engineering, biology, history, public speaking, and psychology (Florida International University, 1996).

Tri-County Technical College

Tri-County Technical College (Pendleton, South Carolina) is developing a curriculum-integrated information literacy program for students enrolled in its two-year associate degree programs. The program focuses on finding and evaluating information, and on using information in context of the students' chosen career fields. The college offers degrees in Business and Human Services, Health Education, and Industrial and Engineering Technology (Tri-County Technical College, 1998).

The Role of Faculty

Although most academic institutions see the necessity for information literacy skills instruction, budgetary constraints often dictate the number of library personnel assigned to such instruction. As academic librarians work with individual faculty members to integrate information skills instruction, they often find themselves overwhelmed with the task of working with every course taught by every faculty member to ensure that all students develop information literacy skills. To remedy this situation, some academic institutions are developing programs to prepare faculty to integrate information literacy skills into their courses. This places the academic librarian in the role of collaborator and mentor (Smith, 1997).

North Dakota State

The staff at the Mundt Library at North Dakota State has concluded that:

> . . . faculty are *the* critical market for reaching our goal of student information literacy. Information literacy will be integrated throughout the curriculum only if faculty recognize its importance, make it a goal as they develop their syllabi, and know how to teach information literacy themselves (Smith, 1997, Online).

To realize faculty instruction in information skills, the concept of information competence must be accepted by faculty as a component of undergraduate education. The Library Committee, consisting of general faculty, will review the Mundt Library's information literacy competencies which will then be presented to the faculty. The library hopes that as the college is reviewing general education requirements in the near future, information literacy will be included as one component. Following this, the challenge to the staff at the Mundt Library will be to develop faculty training that will be convenient and frequent. Library staff members will develop handouts, Web documents, and other materials that can be adapted by faculty for teaching information literacy skills.

Oberlin College

Librarians at Oberlin College have presented extensive workshops to the faculty on topics such as:

- Information sources and search strategies
- Standard reference sources
- How catalogs and databases are organized
- Effective database searching
- Electronic indexes
- Lexis/Nexis and other full-text databases
- Tools for searching the Web
- Government documents

- Information literacy in the curriculum (Oberlin College Library, 1997, June 24).

The last one focuses on how to integrate information literacy skills into existing courses. Responses to the workshop include the following comments from faculty:

> . . . Having taken this workshop, I am in a better position to help our students become more information literate, instead of leaving the task entirely to the librarians (Oberlin College Library, 1997, July 23, Online).

> . . . I'm definitely going to structure research projects in my advance courses around teaching students what research is and how you go about it, rather than just sending them off to the library (Oberlin College Library, 1997, July 23, Online).

The Winter 1998 workshop co-sponsored by the staff at the library and the staff of the Oberlin Center for Technologically Enhanced Teaching (OCTET), titled "Using Education Technology to Teach Information Literacy," set the following ambitious goals:

- To work with faculty on strategies for teaching the critical use of information resources in academic study and scholarly research
- To raise faculty members' comfort level with educational technology and thereby increase the range of pedagogical options available for promoting information literacy, and
- To assist faculty in developing online syllabi for the spring semester with links to relevant electronic resources (Oberlin College, 1998, Online).

Sessions focused on electronic access to information resources, how to create Web-based course materials, the need for information literacy, and strategies to teach information literacy including how to:

- Introduce information resources to students
- Evaluate electronic information
- Develop effective assignments, and
- Cite electronic resources.

Information Competencies

In the introduction to this chapter, we included a quote from Shapiro and Hughes, who believe that information literacy should be considered a new liberal art (1996). To ensure that all students who graduate from academic institutions are information literate, information literacy efforts need to be undertaken in a systematic way, and must be embraced not only by the staff of academic libraries, but also by the faculty and administration of the academic institution. In recognition of the importance of information literacy, state-wide university systems and individual colleges and universities are undertaking strategic planning to determine information competencies, to incorporate instruction in information competence throughout the curriculum, and to add information competence as a graduation requirement for students. Such efforts are often initiated by librarians and spear-headed by committees who systematically examine programs at other colleges and universities, conduct surveys of students and faculty, arrive at and adopt a definition of information literacy, and create a plan for the dissemination of information competence information.

California State University System

In January 1993, the Council of Library Directors of the California State University (CSU) system, under the auspices of the Commission on Learning Resources and Instructional Technology (CLRIT), embarked on a planning effort to identify and foster information competence. Their charge was to recommend policy guidelines to the Chancellor who facilitates the effective uses of learning resources and instructional technology throughout the CSU system (University Library–Cal Poly Pomona, 1995, Online). The result of the Council of Library Directors efforts is presented in *Transforming CSU Libraries for the 21st Century: A Strategic Plan of the CSU Council of Library Directors.* Information competency for all students was identified as one of the action items. The Commission on Learning Resources and Instructional Technology (CLRIT) approved the strategic plan, and requested that the Office of Academic Affairs form a work group to address the issue of information competence. The group was charged with recommending basic competence levels on the use of recorded knowledge and information, and processes for assessment of student competence (University Library, 1995, Online).

The CSU Work Group on Information Competence began its work in April, 1995. Their investigation of information competence included an extensive literature review, consultation with experts, informal and formal surveys to determine what CSU campuses were already doing in the area of information competence, and a review of how other universities and colleges had defined information competence. As part of their effort, the Work Group sponsored a system wide workshop to examine what is meant by information competence. The definition agreed upon is that "information competence is the fusing or the integration of library literacy, computer literacy, media literacy, technological literacy, ethics, critical thinking, and communication skills" (University Library Cal Poly Pomona, Information Competence in the CSU, A Report, 1995, Online).

After an examination of the literature, and as a result of the workshop, the Work Group defined a set of core competencies, revised in January 1997, which read:

Information Competence
A Set of Core Competencies

In order to be able to find, evaluate, use, communicate and appreciate information in all its various formats, students must be able to demonstrate the following skills:

1. Formulate and state a research question, problem or issue not only within the conceptual framework of a discipline, but also in a manner in which others can readily understand and cooperatively engage in the search.

2. Determine the information requirements for a research question, problem or issue in order to formulate a search strategy that will use a variety of resources.

3. Locate and retrieve relevant information, in all its various formats, using, when appropriate, technological tools.

4. Organize information in a manner that permits analysis, evaluation, synthesis and understanding.

5. Create and communicate information effectively using various media.

6. Understand the ethical, legal and socio-political issues surrounding information.

7. Understand the techniques, points of view and practices employed in the presentation of information from all sources (Curzon, 1997, Online).

An ambitious plan set forth by the work group to include information competence as a priority within the CSU includes four elements:

- To encourage the development of courses or programs, including assessment components, relating to information competence
- To disseminate information about information competence
- To collaborate between CSU and other universities, schools, or agencies to foster connection among programs within and beyond CSU, and
- To create and provide instructional tools to assist with the teaching and learning of information competence.

To carry out the goals set forth by the Work Group, several projects relating to information competence have been funded. Some of these projects include:

- Chico: Information Competence for Business Students: A Self-Paced Course
- Northridge: Information Competence: A Workshop Series for Area High Schools and Junior Colleges
- San Luis Obispo, Pomona, Monterey Bay, Fullerton, Los Angeles: Information Competency Implementation through Interactive Instructional Materials: A Systemwide Collaboration which will develop multimedia presentations, in class exercises, Web instructional modules, and an electronic workbook
- Dominguez Hills in cooperation with Northridge and San Marcos: Developing Information Competencies: A model list, activities and assessment instrument to develop a model list of information competencies for high school, community colleges, and lower division CSU student.

The Information Competence Work Group recommended its continuance through the 1998-99 fiscal year. The group proposed a capstone conference in 1999 to focus on what has been learned about information competence, and the group will publish the deliverables from all of the grant projects for use by all the campuses (Curzon, Information Competence, Memorandum, 1997).

State University of New York System

The State University of New York (SUNY) Council of Library Directors Information Literacy Initiative Committee has been working to identify information literacy competencies and promote their adoption across curricula. Their final report issued on September 30, 1997 contains a detailed list of nine information competencies that can be applied to any discipline. They define information literacy as "the abilities to recognize when information is needed and to locate, evaluate, effectively use, and communicate information in its various formats" (SUNY Information Literacy Initiative, 1997, Online).

SUNY Council of Library Directors Information Literacy Initiative Committee Information Literacy Competencies

Competency 1: To recognize the need for information.

Indicators:

- Recognizes that accurate and comprehensive information is the basis for intelligent decision making.
- Frames appropriate questions based on information needs.
- Defines a manageable focus and time line.

Competency 2: To access information from appropriate sources.

Indicators:

- Understands and can use the variety of information sources available, including: Internet, CD-ROM interfaces, electronic library catalogs, microformats and print materials.
- Identifies a variety of potential sources of information.
- Can select those sources that are appropriate to a given need.
- Develops efficient and effective search strategies.

- Consults experts for assistance/guidance when needed.
- Understands standard systems of information organization.
- Identifies and retrieves information relevant to the question/need.

Competency 3: To develop skills in using information technologies.

Indicators:

- Can access the campus information systems and understands how to access information networks.
- Can access the Internet, and can navigate the information highway to locate information appropriate to the need.
- Uses group communication methods, electronic mail, discussion groups for information gathering, feed back, and interaction.
- Can effectively expand or narrow a search as needed.
- Understands and can use word processing, spreadsheets, databases and computer file management.
- Can manipulate and transfer electronic information.

Competency 4: To critically analyze and evaluate information.

Indicators:

- Filters large amounts of information.
- Determines accuracy, relevance, and comprehensiveness of information.
- Assesses the reliability and accuracy of information.
- Distinguishes among facts, points of view, and opinion.
- Thinks critically about the content of information.
- Understands the process of knowledge generation and publication patterns in appropriate disciplines/fields.

Competency 5: To organize and process information.

Indicators:

- Synthesizes information from a variety of sources.
- Integrates new information into ones own knowledge base.
- Makes inferences, connections, and draws conclusions.
- Organizes information for practical application.

Competency 6: To apply information for effective and creative decision making.

Indicators:

- Applies information in critical thinking and problem solving.
- Creates new information or knowledge through synthesis.
- Produces quality products appropriate to specific needs.

Competency 7: To generate and effectively communicate information and knowledge.

Indicators:

- Produces and communicates information in effective and appropriate formats.
- Disseminates information in appropriate modes.
- Evaluates the effectiveness/success of products developed and presented.

Competency 8: To understand and respect the ethical, legal, and socio-political aspects of information and its technologies.

Indicators:

- Respects the principles of equitable access to information.
- Respects intellectual property rights.
- Applies principles of academic honesty in use of information.
- Acknowledges works of others through accurate citations and references.

Competency 9: To develop attitudinal objectives that lead to appreciation of lifelong learning.

Indicators:

- Understands that information searching requires time, diligence, and practice, and that skills are learned over time.
- Increases self-confidence with practice and experience in information seeking.
- Recognizes that the information search process is evolutionary and changes during the course of investigation.
- Knows that careful and attentive scrutiny of information tools and resources is essential to success.
- Appreciates that information literacy requires an ongoing involvement with learning and information technologies so that independent lifelong learning is possible (SUNY Information Literacy Initiative, 1997, Online).

The committee recommends an ambitious process for creating an awareness of the importance of information literacy, and for integrating information literacy competencies into courses throughout the SUNY system. One means for implementation is similar to the Writing Across the Curriculum (WAC) initiative that focuses on the integration of writing skills throughout disciplines other than English. The committee suggests that libraries form the locus of information competency efforts, and that librarians fulfill the leadership/support role for the integration of information literacy competencies, much as the campus writing centers provide this role for the Writing Across the Curriculum initiative.

University of Massachusetts System

The Information Literacy Project of the University of Massachusetts began in 1996 with funding from the Office of the President. Committee members included librarians from all five campuses who consulted with academic computing personnel and faculty to develop information literacy competencies. Four discussion meetings covering the topics of defining information literacy, establishing competencies, developing outcome-based strategies, and implementing ideas were held beginning in October, 1996 and concluding in May, 1997. Between these sessions, an interactive Internet Web page focusing on the results of the discussions was created on the UMass at Dartmouth Web site. Participants and faculty throughout the UMass system were invited to add their comments to the discussions (University of Massachusetts, Dartmouth, 1997).

The committee decided to adopt the American Library Association definition of information literacy. In developing competencies, the committee referenced Stripling and Pitts' *Brainstorms and Blueprints: Teaching Research as a Thinking Process* (1988) which offers a taxonomy comprised of six levels:

- Level 1: Fact finding
- Level 2: Asking questions
- Level 3: Organizing information
- Level 4: Evaluating/deliberating
- Level 5: Integrating/concluding
- Level 6: Conceptualizing.

Because the committee decided that no assumptions could be made regarding the level of skills that entering students would bring to the University, the competencies include each aspect of the six taxonomies.

The competencies developed by the committee state that University of Massachusetts students will:

1. Recognize the need for information

- By articulating the assignment, project or information need
- By stating the purpose of the information need
- By initiating a search strategy
- By relating the information needed to what is already known
- By identifying appropriate and using general reference sources (including people, multimedia, WWW, and print)
- By restating concepts in own words

2. Formulate questions based on information needs

- By using different types of questions (e.g., seeking information, analysis, opinion)
- By developing a central question that is the foundation of a thesis statement
- By noting key words, concepts, and phrases

3. Identify potential sources of information

- By identifying and using types of resources relevant to the research topic (including multimedia, people, WWW, and print, etc)
- By developing an awareness of the structure of databases
- By understanding the limitation of databases and print resources (dates, errors, self-imposed, subject matter limits, timeliness, updates)
- By differentiating between primary and secondary sources
- By identifying possible databases to be searched

4. Develop and use successful search strategies

- By accessing print and technology based sources of information
- By using electronic resources to locate, retrieve and transfer information
- By knowing when and how to obtain assistance from a reference librarian, particularly when accessing library resources
- By systematically organizing information

- By understanding the advantages and disadvantages of different database search techniques (truncation, free text, fixed vocabulary, combined free text/fixed vocabulary, Boolean)
- By being able to broaden and narrow searches as necessary
- By recognizing that information is organized in one or a combination of ways (e.g., by date, by author, by geographic location, by type of product, etc.)
- By interpreting information found in reference sources, including electronic sources
- By revising or expanding the thesis statement as necessary
- By using subject headings or cross references to find additional resources
- By crediting sources
- By using electronic resources to locate, retrieve and transfer information
- By following established etiquette and local guidelines for using electronic resources
- By determining availability of resources and knowing how to obtain those not available locally
- By knowing how to print, photocopy, download, etc.

5. *Evaluate information*

- By differentiating between fact and opinion
- By identifying currency, authority (motive, point of view bias, scholarship, intended audience, objectivity, consistency)
- By eliminating irrelevant pieces of information
- By distinguishing between popular and scholarly resources

6. *Use information*

- By communicating clearly
- By paraphrasing accurately
- By determining the most effective means of presentation (decide purpose, audience process)

- By preparing an accurate bibliography
- By integrating information from a variety of sources (University of Massachusetts, Dartmouth, 1997, Online).

The Information Literacy Project committee received funding from the Office of the President to develop a generic WWW site that could be used by students in freshman level courses. Plans call for the site to be piloted in one course on each of the five University of Massachusetts campuses (Barnes, personal correspondence, March 4, 1998).

University of Arizona

The University of Arizona Library initiated an Information Literacy Project to determine what information skills students need, examine programs at other colleges and universities, and develop models for an information literacy program. The project charge states:

> Many University of Arizona students do not possess the information seeking or computer related skills to complete the assignments that are expected of them. Because of this wide variety of information skill mastery, faculty are limited in the types of interaction and assignments they can pursue (University of Arizona Library, Information Literacy Project: Project Charge, 1996, Online).

As defined by the University of Arizona Library, individuals are information literate:

> . . . if they recognize that they have a need for information; possess the knowledge and skills that enable them to discover where and how to find the information they are seeking; are comfortable using the necessary tools to find, modify, and assimilate that information into another work; and can critically evaluate and synthesize the information they find to understand the social, economic, and

political implications of the information (University of Arizona Library: Information Literacy Project, Information Literacy Defined, 1996, Online).

An Education Action Planning Team was formed as the result of a 1996-97 Information Literacy Project. The team was charged with the task of creating a campus-wide, competency-based information literacy program. The team is working to formally adopt a set of information literacy competencies as the framework for the program. It will coordinate the creation of an information literacy Web tutorial, market the information literacy program to promote campus-wide awareness, and coordinate the integration of information literacy competencies into the instructional activities of the library. Three Information Literacy colloquium classes were taught during the fall 1997 semester. Each one-hour class focused on a broad subject area: Fine/Arts Humanities, Science/Engineering, and Social Sciences.

Establishment of the Institute for Information Literacy

In order to initiate, develop, and teach information skills in higher education, it is important that academic librarians and administrators be knowledgeable in the theory and practice of information literacy. To meet this need, the Association of College and Research Libraries (ACRL) has established the Institute for Information Literacy (IIL). IIL is dedicated to playing a leadership role in assisting individuals and institutions in integrating information literacy throughout the full spectrum of the education process. IIL has four goals: (1) to prepare librarians to become effective teachers of information literacy programs; (2) to support librarians and other educators and administrators in playing roles in the development and implementation of information literacy programs; (3) to forge new relationships throughout the educational community to work towards information literacy curriculum development; and, (4) to offer opportunities for growth and development in the changing field of information literacy.

Cerise Oberman, dean of library and information services, conceived the idea for IIL. Oberman introduced IIL in her keynote speech for the 1997 Library and Orientation Exchange (LOEX) Conference as one possibility for meeting the demand for information skills instruction in higher education. Response to the idea was enthusiastic, and ACRL embraced the idea.

Oberman now chairs the IIL Advisory Committee which includes representatives from other academic institutions and higher education organizations. IIL has developed four program initiatives for 1998-2000 focusing on:

1. Offering professional development for new librarians, librarians new to teaching and for mid-career librarians who will assume a leadership role in information literacy in their institutions or communities

2. Assisting individual institutions in developing strategies for the implementation of effective information literacy programs

3. Helping community partners such as K-12 schools, public libraries and academic libraries institute 'community-based' information literacy programs, and

4. Establishing a Web site that provides links to a wide variety of information literacy issues including best practices, assessment, and links to other literacy resources.

In the summer of 1999, IIL will sponsor its first immersion program. This intensive four and a half day education and training workshop will be designed and taught by a national faculty of six outstanding instruction librarians. Additional information about the Institute for Information Literacy may be obtained by visiting the IIL Web site at *http://www.ala.org/acrl/nili/nilihp.html*

Summary

The 1990s have seen colleges and universities implement information literacy instruction in a number of ways. The inclusion of information competencies as a graduation requirement is the key that will fully integrate information literacy into the curriculum of academic institutions. Key points in this chapter include:

- Information literacy instruction in higher education can take a variety of forms: stand-alone courses or classes, online tutorials, workbooks, course-related instruction, or course-integrated instruction. The latter may be more effective since the information literacy instruction is part of the course.

- State-wide university systems and individual colleges and universities are undertaking strategic planning to determine information competencies, to incorporate instruction in information competence throughout the curriculum, and to add information competence as a graduation requirement for students.

- As colleges and universities implement information literacy requirements, academic librarians may be overwhelmed by requests for instruction. Some academic library programs are preparing faculty to facilitate their students' mastery of information literacy skills so that the faculty can in turn provide information literacy learning experiences for the students enrolled in their classes.

- The Association of College and Research Libraries (ACRL) has established the Institute for Information Literacy (IIL) to play a leadership role in assisting individuals and institutions in integrating information literacy throughout the full spectrum of the education process.

chapter 9

Technology and Information Literacy

> "Just as 16th century navigators were required to read the stars and understand tides to find their way, today's students must learn to become information navigators, finding their way through print, graphic, electronic, and visual media to discover and interpret relevant information. They must become critical thinkers and analyzers using technology to access, interpret, and evaluate the quality and appropriateness of the information they have discovered.

> And, as navigators of old drew maps to share what they found with others, today's students must learn how to create and share knowledge using all the forms of media and telecommunications to communicate their ideas, engage in discourse, and solve problems" (Illinois State Board of Education, 1996, p. 27.)

This statement eloquently details the need for students to be technology literate. In this chapter, we will examine technology and determine how information literacy and technology fit together in the K-12 and higher education environments.

Familiarity with computers is becoming a prerequisite for most jobs. Educators must prepare students for the future by teaching them computer skills. Educators and the general public widely accept the premise that students must be technologically competent in order to be successful today and in the future, however competence with technology must be set within in the context of information literacy. As noted in Chapter 4, the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills [SCANS] (1991) states that the competencies for all entry-level employees must include the ability to: (1) acquire and use information, and (2) work with a variety of technologies.

Peter Drucker (1992), well-known management guru, argues that "executives have become computer-literate . . . but not many executives are information literate" (p. A16). Being able to use computers is not enough. Executives must be able to apply computer skills to real situations and real needs. They must be able to identify information problems and locate, use, synthesize, and evaluate information in relation to those problems.

Information technology affects everyone. Today's successful companies focus on meaningful uses of information technology, and hire employees who are able to apply technology to a range of situations. It is the responsibility of our educational system to develop students who are not only technologically literate, but also information literate. Students need to know how to use technology to solve information problems.

Technology in K-12 Schools

According to a 1997 Educational Testing Service report, computers are in 98% of all schools. School administrators are clearly beginning to see computers as more than just word-processing tools. Sixty-four percent of U.S. schools have access to the Internet, up from 35% in 1994 and 50% in 1995. Through computer networks, students have access to a whole world of information (ETS, 1997).

The Corporation for Public Broadcasting (CPB) *Study of School Uses of Television and Video* (1997) similarly reports the infusion of television and video technology in schools. Ninety-eight percent of teachers in the study reported that television and video is available in their school to use for instructional purposes. Other technologies in schools include video cameras, video editing equipment, and TV studios.

Computer and communications technology can be used in education in a number of ways to:

- Individualize instruction
- Increase the ability to access, evaluate and communicate information
- Increase the quantity and quality of students thinking and writing
- Improve students ability to solve complex problems
- Cultivate artistic expression
- Increase global awareness
- Create opportunities for students to share meaningful work with an audience other than the teacher and class
- Provide access to courses not available locally
- Make students feel comfortable with the tools of the Information Age
- Increase the productivity and efficiency of schools (Peck & Doricott, 1994).

Two Approaches to Technology Education

There are two pedagogical approaches to technology in K-12 schools: technology as the object of instruction; and the process/skills in context approach—using technology as a tool. The latter approach is becoming more widely supported as being consistent with current pedagogy and preparing students for lifelong learning.

Technology as the Object of Instruction

Technology as an object of instruction in schools finds its roots in the business courses that have long been a staple in American high schools. Just as students were once taught how to type on electric typewriters, many are now taught principles of computing. They are taught important computer applications, basic architecture, and so forth. This approach teaches computers as an academic subject. Students learn about computers much as they do about biology or American history. There is no doubt that in today's world, all students need to learn about computers in order to succeed in the marketplace. Schools that teach technology as an object of instruction attempt to meet this need through the curriculum.

The Association of Computing Machinery Model High School Computer Science Curriculum (1997), currently in its fourth draft, is an example of teaching technology as an object of instruction. The ACM Model outlines the skills necessary to succeed in an economy dependent upon information technology.

> Computer technology has a profound effect on our society and world. Every citizen needs some familiarity with this technology and its consequences in the home, school, workplace and community. Because the details of the technology change from day to day, keeping up with those details is difficult and often unproductive. Therefore the study of the subject must concentrate on the fundamental scientific principles and concepts of the field (ACM, 1997, Online).

The ACM Model argues that computer science should be considered an integral part of the high school curriculum for all students, and that information technology should be taught as a subject in the core curriculum. The ACM Model focuses on competency in the following seven areas:

- Algorithms
- Programming languages
- Operating systems and user support
- Computer architecture
- Social, ethical, and professional context
- Computer applications
- Additional topics (artificial intelligence, graphics, etc.)

These topics can be approached through a variety of teaching styles. While hands-on learning in a lab may benefit some students, others might learn better through an apprenticeship in a computer company. Rather than focusing on in-context instruction, the ACM approach to information technology instruction pushes skill sets and discrete concepts to the forefront of instruction.

Technology as an Integral Tool: The Process/Skills in Context Approach

As we saw in Chapter 6, current educational paradigms focus on:

- The acquisition of higher-order thinking and problem-solving skills
- The integration of basic skills with real world tasks
- The availability of information resources for use at the time of need
- The active role of students as architects of their own education.

Using technology as an integral tool supports these constructs. Rather than teaching individual skills out of context as in the technology-as-the-object-of-instruction model, the technology-as-an-integral-tool model emphasizes the use of technology in context to accomplish goals and solve problems. Examples of this approach include:

- A journalism class using a desktop publishing program to design and layout the school newspaper
- An art class using a digital camera to take pictures of their art work then using a Web authoring program to create Web pages displaying their art work to the world
- A physical education class using software to record and analyze information from heart monitors worn while exercising
- A foreign language class using a videotape-editing program to edit a skit the students had previously written and videotaped.

Integration of technology throughout the curriculum is advocated in the 1997 *Report to the President on the Use of Technology to Strengthen K-12 Education in the United States* which recommends that schools:

> **Focus on learning *with* technology, not *about* technology.** Although both are worthy of attention, it is important to distinguish between technology as a subject area and the use of technology to facilitate learning about any subject area. While computer-related skills will unquestionably be quite important in the twenty-first century, and while such skills are clearly best taught through the actual use of computers, it is important that technology be integrated throughout the K-12 curriculum, and not simply used to impart technology-related knowledge and skills. Although universal technological literacy is a laudable national goal, the Panel believes the Administration should work toward the use of computing and networking technologies to improve the quality of education in all subject areas (President's Committee of Advisors on Science and Technology Panel on Educational Technology, 1997, Online).

Eisenberg and Johnson (1996) concur by arguing that teaching students a "laundry list" of technology skills and concepts does not give them adequate preparation for the information society of the future. The authors view technology skills in the context of the information problem-solving process which, in turn, is taught in the context of the curriculum. For example, searching the Web is viewed as a location and access skill and brainstorming with classmates in a chat environment is seen as task definition. Eisenberg and Johnson demonstrate how technology skills can be viewed in an information literacy context by creating a chart of technology skills using the Big6™ Information Problem-Solving Process (see Figure 9.1).

Figure 9.1 Technology as a Tool

Applications in a Big6™ Context

Word processing, graphics, Desk top publishing	Synthesis Use of Information
Information retrieval systems	Information Seeking Location & Access
Spreadsheets, Database management systems	Synthesis
Hypermedia	Use of Information Synthesis
CD networks	Information Seeking Location & Access

Eisenberg & Johnson (1996)

Many U.S. states are starting to embrace the idea of teaching technology skills in the context of information problem solving. Fulton (1997) provides details of efforts in Oregon, where technology standards are incorporated with information literacy standards, and in Illinois where the standards call for students to become:

- Information seekers, navigators, and evaluators
- Critical thinkers, analyzers, and selectors of information and technologies appropriate to the task
- Creators of knowledge using information resources and technology
- Effective communicators using a variety of appropriate technologies/media
- Technical users
- Responsible citizens in a technological age (p. 35).

Technology in Higher Education

The 1997 Campus Computing Survey reported that e-mail, the World Wide Web, and multimedia are increasingly becoming common components of instruction for American college students (in ADEC, 1997). The survey reports that:

> Almost one-third of all courses use e-mail, up from 25 percent in 1996 and 8 percent in 1994. Fully one-fourth (24.8 percent) of all classes draw on resources available on the Internet, compared to 15.3 percent in 1996. And more than an eighth (13.4 percent) of all college courses use some form of multimedia resources, up from 8.4 percent in 1996 and 4 percent in 1994 (Online).

Not only is technology changing instruction on campus, but it is also allowing colleges and universities to offer their courses to students all over the world through distance education. According to the National Center for Education Statistics (1997), one third of higher education institutions offered distance education courses in the fall of 1995. These courses are offered through two-way interactive video, one-way prerecorded video, and, increasingly, through the World Wide Web. The Web is used in distance learning for:

(1) Electronic mail (delivery of course materials, sending in assignments, getting/giving feedback, using a course listserv, i.e., electronic discussion group)
(2) Bulletin boards/newsgroups for discussion of special topics
(3) Downloading of course materials or tutorials
(4) Interactive tutorials on the Web
(5) Real-time, interactive conferencing using MOO (Multiuser Object Oriented) systems or Internet Relay Chat, and
(6) Informatics, the use of online databases, library catalogs, and gopher and Web sites to acquire information and pursue research related to study (Wulf, 1996).

To participate in this Internet enhanced or delivered education system, students must be information literate.

Technology for Information

The Internet is a technology that presents a special set of problems and opportunities for educators in both the K-12 and post secondary environments. The sheer volume of material on the Web easily leads to information overload, and the less-than-perfect searching tools it provides often lead to frustration. Eisenberg and Berkowitz (1996) advocate teaching students to use the Internet in the same way any technology is taught—from a process approach. Information technology skills, particularly those relating to the Internet, must be taught within two different contexts—the subject area curriculum and the overall information literacy process. By learning technology skills in context, students of all ages discover how to use technology to meet their information needs. They also learn the kind of mental flexibility they need to adapt to the changing information technology environment.

Figure 9.2 Internet Capabilities in a Big6™ Context

E-mail, listservs, MOO, CUSeeMe	Task Definition Information Seeking, Evaluation
Network navigation (Internet Explorer, Netscape)	Information Seeking Location & Access
Ftp, down/upload	Use of Information
Yahoo, Infoseek Altavista, Hotbot	Location & Access
Home page (WWW) development	Synthesis (Eisenberg & Berkowitz, 1996, p. 94)

Of course, other technologies used in schools, colleges and universities provide access to information. Information is available on CD-ROMs, networked full-text sources, and databases. These sources require a level of information literacy from users comparable to what is necessary for using the Internet. When using these resources, users must be able to select among sources to find the best resources to satisfy their information needs. There are several criteria for determining relevant sources:

- Accuracy
- Completeness
- Reliability (is authoritative)
- Preciseness
- Validity (is on target)
- Availability
- Currency
- Ease-of-use
- Cost
- Entertainment (is fun).

The ability to judge the appropriateness of an information source, whether it is on CD-ROM or on the World Wide Web, is an information literacy skill that all students must learn.

The Benefits of Information Technology

Information technology integrated into the curriculum can enhance the development of students' information literacy skills. A Center for Applied Special Technology (1996) study of 500 fourth and sixth graders in seven large urban districts across the United States looked at students' use of the Internet in the context of a unit of study on Civil Rights. The study was co-sponsored by the Scholastic Network and the Council of the Great City Schools. Students were divided into two groups—those with online access and those without. An overview of the study states:

> The results show significantly higher scores on measurements of information management, communication, and presentation of ideas. It offers evidence that using Scholastic Network and the Internet can help students become independent, critical thinkers, able to find information, organize and evaluate it, and then effectively express their new knowledge and ideas in compelling ways (Center for Applied Technology, 1996, Online).

These are the information literacy skills we want for all of our children. The recent increase in the availability of technology in our schools at all levels affords teachers an opportunity to infuse technology into education, so that students will learn the essential information literacy skills they need to be successful in their future lives.

Summary

> Information technology is the great enabler. It provides, for those who have access to it, an extension of their powers of perception, comprehension, analysis, thought, concentration and articulation through a range of activities which include: writing, visual images, mathematics, music, physical movement, sensing the environment, simulation and communication (Carpenter, 1989, p. 2).

As Carpenter has detailed in the above reference, technology, in all of its various forms, offers us tools to access, manipulate, transform, evaluate, use, and present information. These technology skills are integral to the information problem-solving process which is taught in the context of the curriculum.

Let's review key points in this chapter:

- Technology in schools includes computers, televisions, video cameras, video editing equipment, and TV studios.
- Two approaches to technology in K-12 schools are: technology as the object of instruction, and the process/skills in context approach—using technology as a tool. The latter approach makes sense in terms of current pedagogy.
- Many U.S. states are starting to incorporate technology skills instruction in the context of information literacy skills. Examples from Oregon and Illinois show how this may be achieved.
- Technology is changing the way higher education institutions are offering instruction.
- Use of the Internet needs to be taught within the contexts of the subject area curriculum and the overall information literacy process.
- One study suggests that students who use technology as a tool may become better at managing information and communicating and presenting ideas.

chapter 10

Information Literacy: The Future and the Past

The educational community is recognizing the value of information literacy and is in the process of integrating information literacy skills instruction with the curriculum. In this chapter, we will provide brief examples of areas where we believe information literacy efforts will expand in the future. We will also briefly reflect upon what we have learned about information literacy.

As we noted in previous chapters, efforts to infuse information literacy throughout the educational community are firmly established. These efforts are still expanding thanks to such endeavors as:

- The inclusion of *Information Literacy Standards for Student Learning* in the publication *Information Power: Building Partnerships for Learning*, developed by the American Association of School Librarians (AASL) and the Association for Educational Communications and Technology (AECT)
- The development of information literacy skills standards by many states
- The decision by some national accreditation agencies to include information competency as a component of accreditation, and
- The development of information competencies by colleges and universities.

Where Will We See Information Literacy Efforts Expand in the Future?

Challenges posed by new technologies and the rapidly increasing amount of information available from a variety of sources make it clear that information literacy skills are important for everyone. In the following section, we will take a brief look at areas where information literacy programs have potential for growth.

Public Libraries

The public library is still the place where anyone may have free access to information in both print and electronic formats. Public libraries teach information literacy skills to groups, and in one-to-one sessions. The Deerfield (Illinois) Public Library, for example, is typical of public library programs that provide instruction to the public on how to use computers to access information in various formats including the World Wide Web. The library's Basic Computer Searching Classes are repeated several times each month, and there are special sessions designed specifically for home-based business owners who want to learn how to use the Internet.

The Science, Industry and Business Library (SIBL), located in Manhattan, and part of The New York Public Library, is the world's largest public information center devoted entirely to science and business. The library has an extensive research collection, a wealth of electronic resources, and more than 170 public workstations. To help and encourage the public to use both electronic and print resources, SIBL offers free classes. As many as five classes are offered each day in a state-of-the-art teaching facility. The library trains an average of 1,000 people each month. SIBLs Web workshops are particularly popular. Designed for both beginners and intermediates, they focus on the skills needed to search the World Wide Web. SIBL is developing a new course to teach the public how to evaluate information found on Web sites (Bentley, 1997).

Basic literacy instruction is also common in public libraries. However, basic literacy is no longer sufficient for survival in the information age. Along with learning to read, students must also learn information literacy skills. A project funded by the Lila Wallace Readers' Digest Fund and the American Library Association, allowed the Onondaga County (New York) Public Library (OCPL) to develop such a course. The OCPL adult literacy/learner curriculum teaches basic literacy students how to search for information using a computer (both local and via the Internet), how to communicate via e-mail, how to read their search results, and how to analyze information found in print and electronic resources.

Adult Education

The skills needed to access, evaluate, and use information to maintain employment, or make personal decisions, are constantly changing. Adult learners need to commit to lifelong learning to improve their information skills. In a project sponsored by an NIFL Literacy Leader Fellowship, Cowles (1997) found that there was little difference between the Internet skills of literacy students and the rest of the adult population. Her project team conducted a needs assessment of 245 adult learners and 123 adult education instructors in Oregon. Survey results were used to develop and test curricular materials focusing on information skills for adult learners. Participants were instructors and learners in Oregon, Washington, North Carolina, Ohio, Illinois and other states. A staff development team representing various educational settings such as corrections, family literacy, welfare reform, ESOL, adult basic education, adult secondary education presented the curricular materials to the Adult Literacy and Technology conference in Boise, Idaho and to the Oregon Adult Basic Education Summer Conference. Cowles reports that the project is ongoing with additional support coming from the Northwest Regional Literacy Resource Center and some 353 additional funding sources (Cowles, personal communication, March 1998).

Company Education Programs

As noted earlier, companies must have information literate workers in order to maintain a position in today's economy. Kanter (1996) reported on efforts by the Bank of Boston to teach their employees how to use technology and information. The bank has a long-range education plan that emphasizes information technology training and makes such training available when and where users need it by offering over 100 self-paced courses.

Summary

While no one can predict the future, we believe that public libraries, adult education programs, and company education programs may exhibit a growth in information literacy efforts as the public realizes the benefits of these skills.

Conclusion: A Look Back

Throughout our examination of information literacy, we have shown how information literacy efforts have accelerated since Zurkowski first mentioned the concept in 1974. Because the Final Report of the American Library Association (ALA) Presidential Committee on Information Literacy was the seminal event in the definition, development, and dissemination of the concept of Information Literacy, it seems fitting to conclude this monograph by reprinting a portion of that report here:

> How our country deals with the realities of the Information Age will have enormous impact on our democratic way of life and on our nation's ability to compete internationally. Within America's information society, there also exists the potential of addressing many long-standing social and economic inequities. To reap such benefits, people as individuals and as a nation must be information literate. To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. Producing such a citizenry will require that schools and colleges appreciate and integrate the concept of information literacy into their learning programs and that they play a leadership role in equipping individuals and institutions to take advantage of the opportunities inherent within the information society. Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand (American Library Association Presidential Committee on Information Literacy, 1989, p. 1).

"How our country deals with the realities of the Information Age will have enormous impact on our democratic way of life and on our nation's ability to compete internationally."

An economy based on information requires workers who will know how to locate, analyze, manage, interpret, use and present information in all of its formats. In identifying the skills necessary for the work place of the future, the Secretary's Commission on Achieving Necessary Skills (SCANS) report published in 1991 notes that workers will need to be lifelong learners who possess skills beyond those of reading, writing, and arithmetic. The Commission concluded that due to the global nature of the economy, and the impact of technology, "good jobs will increasingly depend on people who can put knowledge to work" (SCANS, 1991, p. xv).

> **"Within America's information society, there also exists the potential of addressing many long-standing social and economic inequities. To reap such benefits, people as individuals and as a nation must be information literate. . . . Producing such a citizenry will require that schools and colleges appreciate and integrate the concept of information literacy into their learning programs and that they play a leadership role in equipping individuals and institutions to take advantage of the opportunities inherent within the information society."**

Given that the economy will be based on information, it is incumbent upon our educational system, from kindergarten through adult education, to incorporate information literacy skills instruction within content areas. The publication of the *Information Literacy Standards for Student Learning* in the national guidelines for school library media programs, *Information Power: Building Partnerships for Learning*, will foster this process on the K-12 level as library media specialists and teachers work collaboratively to provide opportunities for students to learn information literacy from the content. Higher education institutions are well on their way to including information literacy competencies as a graduation requirement, while academic librarians and faculty members work together to make this a reality. The creation of the Institute for Information Literacy (IIL) helps the effort by providing models for information literacy skills instruction.

> **"To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information."**

Educators and librarians have used this definition of information literacy as a springboard for discussion of what information literacy entails. Many information literacy definitions, developed throughout the 1990s, have expanded this definition to include information in its variety of formats. The *Information Literacy Standards for Student Learning* and many examples of specific information competencies developed by those in higher education enumerate the skills inherent in becoming information literate. Among these skills is the use of technology. Technology is changing the way we learn and is making information instantaneously available in a variety of formats. Technology is a tool that allows us to access, manipulate, transform, evaluate, use, and present information. These technology skills are integral to the information literacy skills that are taught in the context of the curriculum.

> **"Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand."**

Patricia Senn Breivik, noted information literacy advocate and author, states that "In this next century, an 'educated' graduate will no longer be defined as one who has absorbed a certain body of factual information, but as one who knows how to find, evaluate, and apply needed information" (1998, p. 2). Breivik's quote embodies the shift in our educational institutions to focus on process rather than content. However, we must realize that even after we graduate, our education is never complete. Our ability to be information literate depends on our willingness to be lifelong learners as we are challenged to master new, and as yet unknown, technologies that will surely alter the landscape of information in the future.

appendix A

Information Literacy Standards for Student Learning

Prepared by the American Association of School Librarians and the Association for Educational Communications and Technology

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NOTE: These standards have been excerpted from: Information Power: Building Partnerships for Learning, American Library Association. Chicago: Author, 1998.

The following three categories, nine standards, and twenty-nine indicators describe the content and processes related to information that students must master to be considered well educated. The items related to information literacy describe the core learning outcomes that are most obviously related to the services provided by school library media programs. The items related to the other two other areas—independent learning and social responsibility—are grounded in information literacy and describe more general aspects of student learning to which school library media programs also make important contributions.

The latter two categories build upon the first so that, taken together and pursued to the highest levels, the standards and indicators present a profile of the information literate high school graduate: one who has the ability to use information to acquire both core and advanced knowledge and to become an independent, lifelong learner who contributes responsibly and productively to the learning community. The standards and indicators themselves are written at a level of generality that assumes that individual states, districts, sites, and school personnel must provide the level of detail necessary to apply them across multiple sources and formats of information and to the developmental, cultural, and learning needs of all the students they serve.

Information Literacy Standards for Student Learning

Category I: Information Literacy

Standard 1: The student who is information literate accesses information efficiently and effectively.

Indicator 1: Recognizes the need for information

Indicator 2: Recognizes that accurate and comprehensive information is the basis for intelligent decision making

Indicator 3: Formulates questions based on information needs

Indicator 4: Identifies a variety of potential sources of information

Indicator 5: Develops and uses successful strategies for locating information.

Standard 2: The student who is information literate evaluates information critically and competently.

Indicator 1: Determines accuracy, relevance, and comprehensiveness

Indicator 2: Distinguishes among fact, point of view, and opinion

Indicator 3: Identifies inaccurate and misleading information

Indicator 4: Selects information appropriate to the problem or question at hand.

Standard 3: The student who is information literate uses information accurately and creatively.

Indicator 1: Organizes information for practical application

Indicator 2: Integrates new information into one's own knowledge

Indicator 3: Applies information in critical thinking and problem solving

Indicator 4: Produces and communicates information and ideas in appropriate formats.

Category II: Independent Learning

Standard 4: The student who is an independent learner is information literate and pursues information related to personal interests.

Indicator 1: Seeks information related to various dimensions of personal well-being, such as career interests, community involvement, health matters, and recreational pursuits

Indicator 2: Designs, develops, and evaluates information products and solutions related to personal interests.

Standard 5: The student who is an independent learner is information literate and appreciates and enjoys literature and other creative expressions of information.

Indicator 1: Is a competent and self-motivated reader

Indicator 2: Derives meaning from information presented creatively in a variety of formats

Indicator 3: Develops creative products in a variety of formats.

Standard 6: The student who is an independent learner is information literate and strives for excellence in information seeking and knowledge generation.

Indicator 1: Assesses the quality of the process and products of personal information seeking

Indicator 2: Devises strategies for revising, improving, and updating self-generated knowledge.

Category III: Social Responsibility

Standard 7: The student who contributes positively to the learning community and to society is information literate and recognizes the importance of information to a democratic society.

Indicator 1: Seeks information from diverse sources, contexts, disciplines, and cultures

Indicator 2: Respects the principle of equitable access to information.

Standard 8: The student who contributes positively to the learning community and to society is information literate and practices ethical behavior in regard to information and information technology.

Indicator 1: Respects the principles of intellectual freedom

Indicator 2: Respects intellectual property rights

Indicator 3: Uses information technology responsibly.

Standard 9: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information.

Indicator 1: Shares knowledge and information with others

Indicator 2: Respects others' ideas and backgrounds and acknowledges their contributions

Indicator 3: Collaborates with others, both in person and through technologies, to identify information problems and to seek their solutions

Indicator 4: Collaborates with others, both in person and through technologies, to design, develop, and evaluate information products and solutions.

appendix B

SCANS:

A Three-Part Foundation

Basic Skills: ***Reads, writes, performs arithmetic and mathematical operations, listens, and speaks.***

Reading: Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
Writing: Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
Arithmetic/Mathematics: Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
Listening: Receives, attends to, interprets, and responds to verbal messages and other cues.
Speaking: Organizes ideas and communicates orally.

Thinking Skills: ***Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reason.***

Creative Thinking: Generates new ideas.
Decision Making: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
Problem Solving: Recognizes problems and devises and implements plan of action.
Seeing Things in the Minds Eye: Organizes and processes symbols, pictures, graphs, objects and other information.
Knowing How to Learn: Uses efficient learning techniques to acquire and apply new knowledge and skills.
Reasoning: Discovers a rule or principle underlying the relationship between two or more objects and applies it in solving a problem.

Personal Qualities: ***Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.***

Responsibility: Exerts a high level of effort and perseveres towards goal attainment.

Self-Esteem: Believes in own self-worth and maintains a positive view of self.

Sociability: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings.

Self-management: Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.

Integrity/Honesty: Chooses ethical courses of action.

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appendix C

SCANS:

Definitions: The Five Competencies

Resources:

Allocates Time: Selects relevant, goal-related activities, ranks them in order of importance, allocates time to activities, and understands, prepares, and follows schedules.

Allocates Money: Uses or prepares budgets, including making cost and revenue forecasts, keeps detailed records to track budget performance, and makes appropriate adjustments.

Allocates Material and Facility Resources: Acquires, stores, and distributes materials, supplies, parts, equipment, space, or final products in order to make the best use of them.

Allocates Human Resources: Assess knowledge and skills and distributes work accordingly, evaluates performance, and provides feedback.

Interpersonal:

Participates as a Member of a Team: Works cooperatively with others and contributes to group with ideas, suggestions, and effort.

Teaches Others: Helps others learn.

Serves Clients/Customers: Works and communicates with clients and customers to satisfy their expectations.

Exercises Leadership: Communicates thoughts, feelings, and ideas to justify a position. Encourages, persuades, convinces or otherwise motivates an individual or groups, including responsibly challenging existing procedures, policies, or authority.

Negotiates: Works towards an agreement that may involve exchanging specific resources or resolving divergent interests.

Works with Cultural Diversity: Works well with men and women and with a variety of ethnic, social, or educational backgrounds.

Information:

Acquires and Evaluates Information: Identifies need for data, obtains it from existing sources or creates it, and evaluates its relevance and accuracy.

Organizes and Maintains Information: Organizes, processes, and maintains written or computerized records and other forms of information in a systematic fashion.

Interprets and Communicates Information: Selects and analyzes information and communicates the results to others using oral, written, graphic, pictorial, or multi-media methods.

Uses Computers to Process Information: Employs computers to acquire, organize, analyze, and communicate information.

Systems:

Understands Systems: Knows how social, organizational, and technological systems work and operates effectively within them.

Monitors and Corrects Performance: Distinguishes trends, predicts impact of actions on system operations, diagnoses deviations in the function of a system/organization, and takes necessary action to correct performance.

Improves and Designs Systems: Makes suggestions to modify existing systems to improve products or services, and develops new or alternative systems.

Technology:

Selects Technology: Judges which set of procedures, tools, or machines, including computers and their programs, will produce the desired results.

Applies Technology to the Task: Understands the overall intent and the proper procedures for setting up and operating machines, including computers and their programming systems.

Maintains and Troubleshoots Technology: Prevents, identifies, or solves problems in machines, computers, and other technologies.

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appendix D

A Chronology of the Development of Information Literacy

The following chronology was constructed by combining information from this publication with that explored by Shirley Behrens in "A Conceptual Analysis and Historical Overview of Information Literacy"(1994). It is not meant to be all inclusive nor was it constructed to exclude any particular viewpoint or source. The reader is referred to Behrens' article for an excellent discussion and analysis of the development of information literacy.

1974 Zurkowski introduces the concept of information literacy in a proposal submitted to the National Commission on Libraries and Information Science (NCLIS):

> People trained in the application of information resources to their work can be called information literates. They have learned techniques and skills for utilizing the wide range of information tools as well as primary sources in molding information-solutions to their problems (Zurkowski, 1974, p. 6).

1976 Burchinal presents a paper at the Texas A & M University library's symposium that further refines information as a set of skills:

> To be information literate requires a new set of skills. These include how to locate and use information needed for problem-solving and decision-making efficiently and effectively (Burchinal, 1976, p. 11).

1979 The Information Industry Association (IIA) defines an information literate as:

> . . . a person who knows the techniques and skills for using information tools in molding solutions to problems (Garfield, 1979, p. 210).

1979 Taylor suggests the elements of information literacy in *Library Journal*:

> an approximate definition of [information literacy] would include the following elements:
>
> - That solutions to many (not all) problems can be aided by the acquisition of appropriate facts and information

- That knowledge of the variety of information resources available (who and where) is a requisite of this literacy
- That the information process, which is continual, is as important as the spot information process, which is occasional, and
- That there are strategies (when and how) of information acquisition (Taylor, 1979, p. 1875).

1982 *Time* magazine names the computer as the Man of the Year.

1983 April - National Commission on Excellence in Education issues *A Nation at Risk*, a report decrying the lack of a rigorous education in the nation's schools. Despite identifying the management of complex information in electronic and digital forms as an important skill in a learning society, the report makes no recommendations on the role of the library or information resources in K-12 education.

1983 In an article in the *Bulletin of the American Society for Information Science*, Hortin refers to computer literacy then to information literacy:

> Computer literacy has to do with increasing our understanding of what the machine can and cannot do. There are two major components of computer literacy: hardware and software (Horton, 1983, p. 14).
>
> Information literacy, then, as opposed to computer literacy, means raising the level of awareness of individuals and enterprises to the knowledge explosion, and how machine-aided handling systems can help identify, access, and obtain data, documents and literature needed for problem-solving and decision-making (p. 16).

1985 Irving's *Study and Information Skills Across the Curriculum* highlights the importance of information skills for students in completing classroom assignments and further asserts that such skills are essential skills for all aspects of life—academic, professional, and personal.

1985 A definition created for the Auraria Library at the Denver campus of the University of Colorado to investigate how the library could use its education program to ensure information literacy of its students states:

> General definition: Information literacy is the ability to effectively access and evaluate information for a given need. (Developed by Martin Tessmer, 1985.)
>
> Characteristics of information literacy:
> - An integrated set of skills and knowledge skills (research strategy, evaluation) knowledge of tools and resources
> - Developed through acquisition of attitudes persistence attention to detail; caution in accepting printed word and single sources
> - Time and labor intensive
> - Need driven (a problem-solving activity)
> - Distinct but relevant to literacy and computer literacy
>
> Information literacy is *not*:
> - (Only) knowledge of resources
> - Library dependent (as a sole source)
> - Information finding (also understanding and evaluating) (in Breivik, 1985, p. 723).

1986 Mancall, Aaron & Walker publish "Educating Students to Think: The Role of the School Library Media Program" which describes the role of school library media program in helping students develop thinking skills and the need to develop an information skills program in all curricular areas.

1987 Kuhlthau publishes *Information Skills for an Information Society: A Review of the Research* which points the way toward the inclusion of information literacy with the curriculum. In this publication she states:

> What does it mean to be literate in an information society? Information literacy is closely tied to functional literacy. It involves the ability to read and use information essential for everyday life. It also involves recognizing an information need and seeking information to make informed decisions. Information literacy requires the abilities to manage complex masses of information generated by computers and mass media, and to learn throughout life as technical and social changes demand new skills and knowledge (Kuhlthau, 1987, p. 2).

1987 March - "Libraries and the Search for Academic Excellence," a symposium co-sponsored by Columbia University and the University of Colorado, brings together academic leaders and leaders in the field of librarianship to examine the role of libraries in academia. The outcomes and action recommendations resulting from the symposium establish the importance of information literacy skills and form the basis for current information literacy efforts in higher education:

> Reports on undergraduate education identify the need for more active learning whereby students become self-directed independent learners who are prepared for lifelong learning. To accomplish this, students need to become information literate whereby they:

> - Understand the process and systems for acquiring current and retrospective information, e.g., systems and services for information identification and delivery
> - Are able to evaluate the effectiveness and reliability of various information channels and sources, including libraries, for various kinds of needs
> - Master certain basic skills in acquiring and storing their own information, e.g., database skills, spreadsheet skills, word and information processing skills, books, journals, and report literature, and
> - Are articulate and responsible citizens in considering current and future public policy issues relating to information, e.g., copyright, privacy, privatization of government information, and those issues yet to emerge.
>
> To make possible the above, information gathering and evaluation skills need to be mastered at the undergraduate level, and learning opportunities should be integrated within the existing departments, analogous, to writing across the curriculum, rather than as standalone bibliographic instruction programs. Administrators, faculty and librarians should be engaged in creative new partnerships which transmit to students the value and reward of research in their lives as students and beyond. Information literacy should be a demonstrable outcome of undergraduate education (Breivik & Wedgeworth, 1988, pp. 187-188).

1987 Margaret Chisholm, president of ALA, appoints a Presidential Committee on Information Literacy including leaders in the fields of education and librarianship.

1988 AASL & AECT publish *Information Power* which states that the mission of the school library media program is "to ensure that students and staff are effective users of ideas and information" (AASL & AECT, 1988, p. 1).

1988 Eisenberg & Berkowitz publish *Curriculum Initiative: An Agenda and Strategy for Library Media Programs* which presents the Big6™ Skills Model of Information Problem Solving, a model that gives students a systematic framework for solving information problems.

1988 The National Council for the Social Studies Ad Hoc Committee on Scope and Sequence develops *Essential Skills for Social Studies*, a K-12 scope and sequence that includes acquiring information, organizing and using information, and interpersonal relationships and social participation.

1988 Stripling and Pitts (1988) publish *Brainstorms and Blueprints*, a model of information literacy from the perspective of the school library media field.

1989 January - The American Library Association Presidential Committee on Information Literacy asserts that information literacy is a necessary skill for everyday life, for the business world and for democracy:

> How our country deals with the realities of the Information Age will have enormous impact on our democratic way of life and on our nation's ability to compete internationally. Within America's information society, there also exists the potential of addressing many long-standing social and economic inequities. To reap such benefits, people–as individuals and as a nation–must be information literate. To be information literate, a person must be able to recognize when information is needed

> and have the ability to locate, evaluate, and use effectively the needed information. Producing such a citizenry will require that schools and colleges appreciate and integrate the concept of information literacy into their learning programs and that they play a leadership role in equipping individuals and institutions to take advantage of the opportunities inherent within the information society. Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand (American Library Association Presidential Committee on Information Literacy, 1989, p.1).

1989 April - Based on the recommendation of ALA, a coalition for information literacy was "strategized" at an ALA sponsored meeting in Leesburg, Virginia.

1989 May - Olsen and Coons, in a paper presented at the Seventeenth National LOEX Library Instruction Conference state that:

> We define information literacy as understanding the role and power of information, having the ability to locate it, retrieve it, and use it in decision making, and having the ability to generate and manipulate it using electronic processes. In short, information literacy is a necessary expansion of the traditional notion of literacy, a response to the revolution in which we are living (Olsen & Coons, 1989, p. 8).

1989 September - President Bush and the nation's governors meet at an Education Summit to discuss the state of American education. As a result of the summit, six goals for the improvement of education are outlined.

1989 November 9 - The first meeting of the National Forum on Information Literacy (NFIL), a coalition of organizations from business, government, and education, took place with Patricia Senn Breivik serving as chair.

1989 The National Council for the Social Studies (NCSS) publishes "From Information to Decision Making: New Challenges for Effective Citizenship" (1989) which focuses on information literacy skills and "provides . . . ideas about ways social studies teachers may become effective in an information age with its ever increasing gap between what we understand and what we need to understand" (NCSS, 1989, p. vii).

1989 Breivik and Gee publish *Information Literacy* (1989), a monograph focusing on the role of the academic library in developing lifelong learners:

> Information literacy is a survival skill in the information age. Instead of drowning in the abundance of information that floods their lives, information-literate people know how to find, evaluate, and use information effectively to solve a particular problem or make a decision, whether the information they select comes from a computer, a book, a government agency, a film, or any of a number of other possible resources. Students have long relied on the knowledge of teachers and the information skills of librarians. In fact, when the volume of information was modest, they could often manage

> without becoming information literate themselves. What the information explosion has done is turn an old problem–functional illiteracy–into a new crisis. To address this crisis, we need a new educational philosophy based on a fuller understanding of the information explosion and a redefinition of literacy that includes information skills (p. 12).

1990 President Bush meets with the National Governors' Conference in Charlottesville, Virginia, and together they publicly announce the National Education Goals.

1990 The Secretary's Commission on Achieving Necessary Skills (SCANS) is formed by Secretary of Labor Elizabeth Dole to create a dialogue among workers, parents, and educators to examine the changes taking place in the working world and determine the skills needed for employment.

1991 May 22 - President Bush submits The *America 2000 Excellence in Education Act* to Congress. This represents the Bush administration's plan to implement the National Education Goals.

1991 The SCANS report concludes that due to the global nature of the economy and the impact of technology, "good jobs will increasingly depend on people who can put knowledge to work" (SCANS, 1991, p. xv).

1991 The Association for Supervision and Curriculum Development (ASCD) adopts a resolution on information literacy:

> ***Resolution on Information Literacy***
> Today's information society transcends all political, social, and economic boundaries. The global nature of human

> interaction makes the ability to access and use information crucial. Differences in cultural orientation toward information and symbol systems make the management of information complex and challenging. Current and future reform efforts should address the rapidly changing nature of information and emerging information technologies. Information literacy, the ability to locate, process, and use information effectively, equips individuals to take advantage of the opportunities inherent in the global information society. Information literacy should be a part of every student's education experience (Doyle, 1994, p. 12).

1991 One of the recommendations of the second White House Conference on Library and Information Services (WHCLIS) calls for the U.S. government to establish a National Coalition for Information Literacy (including schools, libraries, labor and industry, government, parents, and the general public), with the intention of developing a strategic plan for the general development of skills required for information literacy.

1991 Goodin's research shows that the students who receive library skills instruction in the context of information literacy scored significantly higher on a post-test than students who did not receive instruction.

1991 National Literacy Act of 1991 defines literacy as "an individual's ability to read, write, and speak in English, and to use the computer and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one's goals, and to develop one's knowledge and potential" (National Institute for Literacy, Online).

1992 Eisenberg and Brown publish "Current Themes Regarding Library and Information Skills Instruction: Research Supporting and Research

Lacking," comparing several widely-known models of information literacy which have been developed through research and evaluation. The authors conclude that there are more similarities than there are differences among these models.

1992 Gratch et al. publish *Information Retrieval and Evaluation Skills for Education Students*, a document outlining essential information literacy skills for students in teacher training programs.

1992 Lance, Welborn, and Hamilton-Pennels' *The Impact of School Library Media Centers on Academic Achievement* (1992) reveals some very important findings:

- Where library media programs are better funded, academic achievement is higher, whether their schools and communities are rich or poor and whether adults in the community are well or poorly educated.
- Better funding for library media programs fosters academic achievement by providing students access to more library media staff and larger and more varied collections.
- Among predictors of academic achievement, the size of the library media program staff and collection is second only to the absence of at-risk conditions, particularly poverty and low educational attainment among adults.
- Students whose library media specialists participate in the instructional process are higher academic achievers.

1992 Doyle publishes the results of a Delphi study analyzing the National Goals for Education and expands the definition of information literacy. An information literate person is one who:

- Recognizes that accurate and complete information is the basis for intelligent decision making
- Recognizes the need for information
- Formulates questions based on information needs
- Identifies potential sources of information
- Develops successful search strategies
- Accesses sources of information including computer-based and other technologies
- Evaluates information
- Organizes information for practical application
- Integrates new information into an existing body of knowledge
- Uses information in critical thinking and problem solving (Doyle, 1992, p. 8).

1992 The State University of New York Task Force on College Entry Level Knowledge and Skills recommends the inclusion of strong information literacy components in teacher education and library school curricula.

1992 The term 'information literacy' is added as a descriptor to the ERIC Thesaurus.

1993 January - The Council of Library Directors of the California State University (CSU) system begins a planning effort to identify and foster information competence under the auspices of the Commission on Learning Resources and Instructional Technology (CLRIT). The Council's charge was to recommend to the Chancellor policy guidelines which facilitate the effective uses of learning resources and instructional technology throughout the CSU (University Library—Cal Poly Pomona, 1995, Online).

1993 Wisconsin Educational Media Association publishes *Information Literacy: A Position Paper on Information Problem-Solving.*

1993 Middle States Association of Colleges and Schools Commission on Higher Education adds assessment of information literacy in the curriculum to its agenda.

1993 Kuhlthau publishes her research into the information seeking behavior of students noting that information literacy is not a discrete set of skills, but rather a way of learning.

1994 March 31 -The *Goals 2000: Educate America Act* specifying the eight National Goals for Education is signed into law by President Clinton.

1994 The American Association of School Librarians publishes a position paper outlining seven basic elements of information literacy.

1994 The Commission on Higher Education (CHE), Middle States Association of Colleges and Schools, which accredits institutions of higher education, develops the following standard on information literacy:

> Each institution should foster optimal use of its learning resources through strategies designed to help students develop information literacy—the ability to locate, evaluate, and use information in order to become independent learners. It should encourage the use of a wide range of non-classroom resources for teaching and learning. It is essential to have an active and continuing program of library orientation and instruction in accessing information, developed collaboratively and supported actively by faculty, librarians, academic deans, and other information providers (in Commission on Higher Education, 1995, p. v).

1994 Breivik and Senn publish *Information Literacy: Educating Children for the 21st Century* (1994), a monograph focusing on the integration of information literacy with the K-12 curriculum via resource-based learning.

1994
to
1995 As the result of a meeting of the National Forum on Information Literacy, a national survey of 3,236 accredited U.S. colleges and universities is conducted to determine the extent to which information literacy had been assimilated into the curriculum of institutions of higher education. The survey involves the Association of College & Research Libraries (ACRL), the Commission on Higher Education (CHE) of the Middle States Association of Colleges and Schools, and the Western Accrediting Commission for Senior Colleges and Universities (WASC). Analysis of the 834 surveys that were returned show that 22% of the respondents had a functional information literacy program and 25% offered a course that focuses on the development of information literacy abilities (Ratteray & Simmons, 1995).

1995 April - The California State University (CSU) Work Group on Information Competence begins to investigate information competence by conducting an extensive literature review, consulting with experts, and undertaking informal and formal surveys to determine what CSU campuses were already doing in the area of information competence. They also review how other universities and colleges have defined information competence.

1995 The Commission on Higher Education of the Middle States hold two symposia to bring together educators who had successfully integrated information literacy into their curriculums. The conclusions of these symposia are:

> Institutions should concentrate on developing effective processes to achieve information literacy and share with other institutions the results, both good and bad, of those efforts.
>
> Information literacy does not cease when the degree is achieved, but it must be viewed as a lifelong learning commitment (CHE, 1995, p. 16).

1995 Pitts' examination of the mental models of secondary students as they work through an information problem shows that when students begin an information problem, they rely upon their prior learning to help them solve it.

1995 The Ministry of Education in Finland Expert Committee, formed in 1994, prepares a strategy for the twenty-first century. *Education, Training, and Research in the Information Society: A National Strategy* identifies information skills for students, adults, teachers, and businesses.

1995 Todd's research finds that when information and library skills are taught to students in the context of information problem-solving and within subject areas, a positive effect on the learning process and on students' attitudes is created.

1995 The Association for Teacher-Librarianship in Canada (ATLC) creates a Student's Bill of Information Rights: Our students face an information-rich future in which change will be one of the few constants of their life experience. Their ability to adapt and fulfill their individual potentials will require them to be life-long learners and independent decision-makers.

> We believe that all students should have the opportunity to:

- Master the skills needed to access information in print, non-print and electronic sources
- Understand and master effective research processes and reporting skills
- Develop the ability to evaluate, extract, synthesize and utilize information from a variety of sources and media
- Utilize data and information to expand their own knowledge base
- Explore the creative use of information
- Develop an understanding of our Canadian cultural heritage and history, as well as cultures and histories of other societies
- Enhance their own self knowledge through developing a love of reading
- Explore the values and beliefs of others by reading world literature
- Think critically, and make decisions based on personal needs and values as well as upon factual evidence, and
- Actively participate in decisions about their own learning.

Information is a vital component in the development of critical thought and independent decision-making, and, consequently, access to the ever-increasing body of available information is vital to the development of students' potentials (Association for Teacher-Librarianship in Canada, 1995, Online).

1996 Eisenberg and Johnson publish "Computer Skills for Information Problem Solving: Learning and Teaching Technology in Context," noting that teaching students a "laundry list" of technology skills and concepts does not give students adequate preparation for the information society of the future. The authors view technology skills in the context of information problem-solving process which, in turn, is taught in the context of the curriculum.

1996 The Information Literacy Project of the University of Massachusetts begins with funds from the Office of the President.

1996 The University of Arizona Library initiates an Information Literacy Project to determine what information skills students need, to examine programs at other colleges and universities, and to develop models for an information literacy program.

1996 AASL and AECT National Guidelines Vision Committee publish a draft of *Information Literacy Standards for Student Learning* stating that ". . . the learning process and the information search process mirror each other: students actively seek to construct meaning from the sources they encounter and to create products that shape and communicate that meaning effectively" (Online).

1997 Cerise Oberman, Dean of Library and Information Service at the Plattsburgh State University of New York, delivers the keynote speech for the Library and Orientation Exchange (LOEX) Conference and proposes a National Information Literacy Institute (later to be renamed the Institute for Information Literacy) as one possibility for meeting the demand for information skills instruction in higher education.

1997 In *The Seven Faces of Information Literacy*, Bruce (1997), an Australia based researcher, proposes a unique approach to researching and defining information literacy by emphasizing the importance of understanding the way that the concept of information literacy is conceived by information users themselves.

1997 September 30 - The State University of New York (SUNY) Council of Library Directors Information Literacy Initiative Committee issues a final report containing a detailed list of nine information competencies that can be applied to any discipline and defines information literacy as "the abilities to recognize when information is needed and to locate, evaluate, effectively use, and communicate information in its various formats" (SUNY Information Literacy Initiative, 1997, Online).

1997 The California Academic and Research Libraries (CARL) establishes a Task Force to Recommend Information Literacy Standards to the Western Association of Schools and Colleges (WASC). A draft version of the task force's recommendations include a Statement of Principles for Information Literacy Criteria that focuses on institutions' roles in developing information literate graduates:

> An institution ensures that all graduating students are information literate through a systematic and course-integrated campus-wide information literacy program. Information literacy learning opportunities are part of general education, academic majors, and graduate/professional programs. Educational program requirements or goals include statements about students' use of libraries, computing, information, and learning resources and how course assignments contribute to their becoming information literate. Professional staffs with appropriate expertise are available to teach information literacy skills and develop collections, learning resources and information literacy curricula and learning experiences. The institution provides support for maintaining and improving the quality of information literacy instruction (1998, Online).

1997 November - The Canadian School Library Association and the Association for Teacher-Librarianship in Canada issue *Students' Information Literacy Needs in the 21st Century: Competencies for Teacher-Librarians* pointing out the necessity of highly skilled and educated teacher-librarians who influence students' development of information literacy skills:

> Students in Canada today need to be able to think rationally and logically. With more and more sources of information, both print and electronic, and the increasing difficulty of ensuring that students can derive meaning from this information, the role of the teacher-librarian becomes central. Teacher-librarians are skilled in accessing and evaluating information regardless of delivery system, book or computer, and proving leadership in the appropriate use of new information technologies (Association for Teacher Librarianship in Canada & Canadian School Library Association, 1997, Online).

1998 March - Breivik, Hancock, and Senn publish *A Progress Report on Information Literacy: An Update on the American Library Association Presidential Committee on Information Literacy: Final Report* on behalf of the NFIL. This progress report examines the six original recommendations identified in the original report and outlines five recommendations that the NFIL has prioritized for action in the future.

1998 National Study of School Evaluation (NSSE) in cooperation with Alliance for Curriculum Reform(ACR) publishes *Indicators of Schools of Quality, Volume 1: Schoolwide Indicators of Quality.* The publication is intended to assist schools in self-assessing the quality of their efforts in improving student learning and includes the information literacy standards developed by AASL and AECT.

1998 Breivik publishes *Student Learning in the Information Age* (1998) which provides numerous examples of information literacy initiatives that other academic librarians and institutions can use to develop similar efforts on their own campuses.

1998 Breivik and Senn publish *Information Literacy: Educating Children for the 21st Century* (1998) Second Edition, focusing on the integration of information literacy with the K-12 curriculum via resource-based learning.

1998 *Information Power: Building Partnerships for Learning* (1998) is published by the American Library Association. The national guidelines for school library media programs include the *Information Literacy Standards for Student Learning.*

Chronology Bibliography

American Association of School Librarians and Association for Educational Communications and Technology. (1988). *Information power: Guidelines for school library media programs.* Chicago: Author. (ED 315 028)

American Association of School Librarians and Association for Educational Communications and Technology National Guidelines Vision Committee. (1996, October). *Information literacy standards for student Learning.* [Online]. Available: *http://www.ala.org/aasl/stndsdrft5.html* [1998, March 15].

American Library Association and Association for Educational Communications and Technology. (1998). *Information power: Building partnerships for learning.* Chicago: Author.

American Library Association Presidential Committee on Information Literacy. *Final Report.* (1989). Chicago: Author. (ED 315 074)

Association for Teacher-Librarianship in Canada. (1995). *Student's bill of information rights.* [Online.] Available: *http://www.sbe.saskatoonlsk.ca/~atlc/studrigh.htm* [1998, April 17].

Association for Teacher-Librarianship in Canada & Canadian School Library Association. (1997, November). *Students information literacy needs in the 21st century: Competencies for teacher-librarians.* [Online]. Available: *http://www.sbe.saskatoon.sk.ca/~atlc/competen.htm* [1998, April 16].

Behrens, S. J. (1994, July). A conceptual analysis and historical overview of information literacy. *College and Research Libraries,* 55(4), p 309-322. (EJ 486 800)

Breivik, P. S. (1985). Putting libraries back in the information society. *American Libraries,* 16 (723).

Breivik, P. S. (1998). *Student learning in the information age.* Phoenix, AZ: Oryx Press.

Breivik, P. S. & Gee, E. G. (1989). *Information literacy.* NY: Macmillan Publishing Co.

Breivik, P. S., Hancock, V. & Senn, J. (1998). *A progress report on information literacy: An update on the American Library Association* Presidential *Committee on information literacy: Final Report.* Chicago: ALA, Association of Research Librarians. pp. 1-10.

Breivik, P. S. & Senn. J. (1994). *Information literacy: Educating children for the 21st century.* New York: Scholastic Inc., Second Edition.

Breivik, P. S. & Wedgeworth, R. (1988). *Libraries and the search for academic excellence.* Metuchen, NJ: Scarecrow Press.

Bruce, C. (1997). *The seven faces of information literacy.* Adelaide (AU): Auslib Press.

Burchinal, L. G. (1976, Sept. 24). The communications revolution: America's third century challenge. In *The future of organizing knowledge: Papers presented at the Texas A & M University library's centennial academic assembly, Sept. 24, 1976.* College Station, TX: Texas A & M University.

California Academic and Research Libraries Task Force. (1997, September 29). *Draft recommendations to WASC on an information literacy standard.* [Online]. Available: *http://www.carl-acrl.org/Reports/rectoWASC.html* [1998, January 18].

Commission on Higher Education. Middle States Association of Colleges and Schools. (1995). *Information literacy, lifelong learning in the middle states region. A summary of two symposia.* Philadelphia: Middle States Association.

Doyle, C. S. (1992). *Final report to National Forum on Information Literacy.* Syracuse, NY: ERIC Clearinghouse on Information Resources. (ED 351 033)

Doyle, C. S. (1994). *Information literacy in an information society: A concept for the information age.* Syracuse, NY: ERIC Clearinghouse on Information and Technology.

Eisenberg, M. B. & Brown, M. K. (1992). Current themes regarding library and information skills instruction: Research supporting and research lacking. *School Library Media Quarterly , 20*(2), 103-109. (EJ 441 731)

Eisenberg, M. B. & Johnson, D. (1996). *Computer skills for information problem solving: Learning and teaching technology in context.* ERIC Digest. (Report no. EDO-IR-96-04). Syracuse, NY: ERIC Clearinghouse on Information and Technology. (ED 392 463)

Garfield, E. (1979). 2001: An information society? *Journal of Information Science*, 1, 210.

Goodin, M. E. (1991). The transferability of library research skills from high school to college. *School Library Media Quarterly , 19*(1), 33-42. (EJ 436 241)

Gratch, B. et al. (1992). *Information retrieval and evaluation skills for education students.*(ED 351 038)

Horton, F. W. (1983). Information literacy vs. computer literacy. *Bulletin of the American Society for Information Science, 9* (14).

Information Competence in the CSU: A report submitted to the Commission on Learning Resources and Instructional Technology (CLRIT) by the CLRIT Information Competence Work Group; revised: 1/97. *A set of core competencies.* [Online]. Available: *http://www.csun.edu/ITR/library/scurzon/corecomp.html* [1998, January 23].

Irving, A. (1985). *Study and information skills across the curriculum.* London: Heinemann Educational Books.

Kuhlthau, C. C. (1987). *Information skills for an information society: A review of research.* Syracuse, NY: ERIC Clearinghouse on Information Resources. (ED 297 740)

Kuhlthau, C. C. (1993). *Seeking meaning: A process approach to library and information services.* Greenwich, CT: Ablex.

Lance, K. C., Welborn, L., & Hamilton-Pennell, C. (1992). *The impact of school library media centers on academic achievement.* Denver: Colorado Department of Education. (ED 353 989)

Mancall, J. C., Aaron, S. L., & Walker, S. A. (1986). Educating students to think: The role of the library media program. A concept paper written for the National Commission on Libraries and Information Science. *School Library Media Quarterly, Journal of the American Association of School Librarians, 15*(1), 18-27. (EJ 344 239)

Ministry of Education, Helsinki (Finland). (1995). *Education, training, and research in the information society: A national strategy.* Helsinki (Finland). (ED 389 258)

National Commission of Excellence in Education. (1983). *A Nation at risk: The imperative for educational reform.* Washington, DC: U.S. Government Printing Office. (ED 226 006)

National Council for the Social Studies. (1989). *From information to decision making: new challenges for effective citizenship.* Washington, DC: NCSS. (ED 310 956)

National Institute for Literacy. (Undated). *Fast facts on literacy.* [Online]. Available: *http://www.nifl.gov/ne world/FASTFACT.HTM* [1998, April 6].

New South Wales Department of Education. (undated) *Information Skills in the School* [brochure] New South Wales: Author.

Olsen, J.K. & Coons, B. (1989). Cornell University's information literacy program. In *Coping with information illiteracy: Bibliographic instruction for the information age.* Papers presented at the seventeenth national LOEX library instruction conference held in Ann Arbor, Michigan, 4-5 May 1989.

Pitts, J. et al. (1995). Mental models of information: The 1993-1994 AASL/Highsmith research award study. *School Library Media Quarterly, 23*(3), 177-184. (EJ 503 402)

Ratteray, O. M. & Simmons, H. L. (1995). *Information literacy in higher education: A report on the middle states region.* Philadelphia, PA: Middle States Association of Colleges and Schools. (ED 388 136)

Secretary's Commission on Achieving Necessary Skills. (1991). *What work requires of schools: A SCANS report for America 2000.* Washington, DC: U.S. Government Printing Office. (ED 332 054)

State University of New York (SUNY) Information Literacy Initiative. (1997, October 2). *SUNY Council of Library Directors information literacy initiative.* [Online]. Available: *http://olis.sysadm.suny.edu/ili/* [1998, January 16].

Stripling, B. & Pitts, J. (1988). *Brainstorms and blueprints: Teaching library research as a thinking process.* Littleton, CO: Libraries Unlimited.

Taylor, R. S. (1979). Reminiscing about the future. *Library Journal*, 104, 1875.

Todd, R. "Integrated information skills instruction: Does it make a difference?" *School Library Media Quarterly 23*(2), 133-139. (EJ 497 921)

The University of Arizona Library. (1996). *Information literacy project: Project charge.* [Online]. Available: *http://dizzy.library.arizona.edu/infolit/ CHARGE.HTM* [1998, March 16].

University Library Cal Poly Pomona. (1995). *Information competence in the CSU: A report.* [Online]. Available: *http://www.csupomona.edu/library/ InfoComp/CLRIT.html* [1998, January 16].

University of Massachusetts, Dartmouth. (1997, June 10). *Information literacy project: Defining competencies.* Available: *http://www2.lib.umassd. edu/library2/INFOLIT/Infolit.html* [1998, January,16].

Wisconsin Educational Media Association. (1993). *Information literacy: A position paper on information problem-solving.* Appleton, WI: WEMA Publication.

Zurkowski, P. G. (1974). The information service environment relationships and priorities. Related paper no. 5. *National Commission on Libraries and Information Science.* (ED 100 391)

appendix

E

Correlation of Information Literacy Skills with Selected National Subject Matter Standards

Note: Appendix E cross correlates selected excerpts from National Standards documents with Doyle's attributes of an information literate person. This table does not cross correlate all aspects of each National Subject Matter standard.

Doyle's Attributes	National Standards for Art Education	
An information literate person is one who:	Music, Standard 6 Achievement Standard, Advanced: Students: f) analyze and describe uses of the elements of music in a given work that make it unique, interesting, and expressive (p.61).	Theatre, Standard 5 Achievement Standard: Students: a) apply research from print and non-print sources to script writing, acting, design, and directing choices (p.47).
recognizes that accurate and complete information is the basis for intelligent decision making		X
recognizes the need for information		X
formulates questions as information needs		X
identifies potential sources of information		X
develops successful search strategies		X
accesses sources of information including computer-bases and other technologies		X
evaluates information	X	X
organizes information for practical application	X	X
integrates new information into an existing body of knowledge		X
uses information in critical thinking and problem solving (Doyle, 1992)	X	X

Doyle's Attributes	National Standards in Economics	
An information literate person is one who:	Standard 5 Voluntary exchange occurs only when all participating parties expect to gain. This is true for trade among individuals or organizations within a nation, and among individuals or organizations in different nations. Benchmark, Grade 4: At the completion of grade 4, students will: 3) describe a trade they have made, such as one with baseball cards, stickers, or lunch desserts, and explain why they agreed to trade (p.9).	Standard 14 Entrepreneurs are people who take risks of organizing productive resources to make goods and services. Profit is an important incentive that leads entrepreneurs to accept the risks of business failure. Benchmark, Grade 8: At the completion of grade 8, students will: 4) Identify a restaurant that went out of business and give reasons why this might have occurred (p.27).
recognizes that accurate and complete information is the basis for intelligent decision making	X	
recognizes the need for information		X
formulates questions as information needs		X
identifies potential sources of information		X
develops successful search strategies		X
accesses sources of information including computer-bases and other technologies		
evaluates information	X	X
organizes information for practical application	X	X
integrates new information into an existing body of knowledge	X	X
uses information in critical thinking and problem solving (Doyle, 1992)	X	X

Doyle's Attributes	National Standards for the English Language Arts	
An information literate person is one who:	8. Students use a variety of technological and informational resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge (p.3).	5. Students conduct research on issue and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g. print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience (p.3).
recognizes that accurate and complete information is the basis for intelligent decision making		
recognizes the need for information		
formulates questions as information needs		X
identifies potential sources of information	X	X
develops successful search strategies	X	X
accesses sources of information including computer-bases and other technologies	X	X
evaluates information	X	X
organizes information for practical application	X	X
integrates new information into an existing body of knowledge	X	X
uses information in critical thinking and problem solving (Doyle, 1992)	X	X

Doyle's Attributes	National Standards for Foreign Language Learning	
An information literate person is one who:	Standard 1.1 Sample progress indicator, Grade 8 Students compare, contrast, and express opinions and preferences about the information gathered regarding events, experiences and other school subjects (p.38).	Standard 5.1 Sample progress indicator, Grade 12 Students present information about the language and culture to others (p.61).
recognizes that accurate and complete information is the basis for intelligent decision making		
recognizes the need for information		
formulates questions as information needs		
identifies potential sources of information	X	
develops successful search strategies	X	
accesses sources of information including computer-bases and other technologies	X	
evaluates information	X	
organizes information for practical application	X	X
integrates new information into an existing body of knowledge	X	
uses information in critical thinking and problem solving (Doyle, 1992)	X	

Doyle's Attributes	National Geography Standards 1994	
An information literate person is one who:	Human systems - Grades K-4 The student is able to describe the characteristics and locations of cities, as exemplified by being able to use maps and other graphics to locate major cities in North America and explain the processes that have caused them to grow (p.129).	Human systems - Grades 9-12. The student is able to analyze and evaluate international economic issues from a spatial point of view, as exemplified by being able to formulate reasoned arguments regarding the causes and geographic consequences of an international debt crisis (p.207).
recognizes that accurate and complete information is the basis for intelligent decision making		X
recognizes the need for information		X
formulates questions as information needs		
identifies potential sources of information		
develops successful search strategies		
accesses sources of information including computer-bases and other technologies	X	X
evaluates information	X	X
organizes information for practical application	X	X
integrates new information into an existing body of knowledge	X	X
uses information in critical thinking and problem solving (Doyle, 1992)	X	X

Doyle's Attributes	National Health Education Standards	
An information literate person is one who:	Performance indicator, Grades 9-11: Students will: 2) demonstrate the ability to evaluate resources from home, school and community that provide valid health information (p.36).	Standard 4 Performance indicator, Grades 5-8: Students will: 2) analyze how messages from media and other sources influence health behaviors (p.33).
recognizes that accurate and complete information is the basis for intelligent decision making	X	
recognizes the need for information		
formulates questions as information needs		
identifies potential sources of information		
develops successful search strategies		
accesses sources of information including computer-bases and other technologies		
evaluates information	X	X
organizes information for practical application	X	X
integrates new information into an existing body of knowledge	X	X
uses information in critical thinking and problem solving (Doyle, 1992)	X	X

Doyle's Attributes	National Standards for History	
An information literate person is one who:	Standard 3 - Grades 5-12 How the United States changed from the end of World War I to the eve of the Great Depression. The student understands politics and international affairs in the 1920s. The student is able to assess the effects of woman suffrage on politics (p.115).	Topic 4: The History of People of Many Cultures Around the World Standard 7 - Grades K-4 The student is able to analyze the dance, music, and arts of various cultures around the world to draw conclusions about the history, daily life, and beliefs of the people in history (p.36).
recognizes that accurate and complete information is the basis for intelligent decision making	X	
recognizes the need for information	X	
formulates questions as information needs	X	
identifies potential sources of information	X	
develops successful search strategies	X	
accesses sources of information including computer-bases and other technologies	X	
evaluates information	X	X
organizes information for practical application	X	X
integrates new information into an existing body of knowledge	X	X
uses information in critical thinking and problem solving (Doyle, 1992)	X	X

Doyle's Attributes	National Standards for School Mathematics	
An information literate person is one who:	Standard 2 In Grades 5-8, the study of mathematics should include opportunities to communicate so that students can reflect on and clarify their own thinking about mathematical ideas and situations (p.78).	Standard 1 In Grades 9-12, the mathematics curriculum should include the refinement and extension of methods of mathematical problem solving so that all students can apply integrated mathematical problem-solving strategies to solve problems from within and outside mathematics (p.137).
recognizes that accurate and complete information is the basis for intelligent decision making		
recognizes the need for information		
formulates questions as information needs		
identifies potential sources of information		
develops successful search strategies		
accesses sources of information including computer-bases and other technologies		
evaluates information		X
organizes information for practical application		X
integrates new information into an existing body of knowledge	X	X
uses information in critical thinking and problem solving (Doyle, 1992)	X	X

Doyle's Attributes	National Standards for Physical Education	
An information literate person is one who:	Standard 5 Demonstrates responsible personal and social behavior in physical activity settings. Grade 8 Sample benchmark: Makes choices based on the safety of self and others (p.70).	Standard 6 Demonstrates understanding and respect for differences among people in physical activity settings. Grade 12 Sample benchmark: Develops strategies for including persons of diverse backgrounds and abilities in physical activity (p.99).
recognizes that accurate and complete information is the basis for intelligent decision making	X	
recognizes the need for information	X	X
formulates questions as information needs		
identifies potential sources of information		
develops successful search strategies		
accesses sources of information including computer-bases and other technologies		
evaluates information	X	X
organizes information for practical application	X	X
integrates new information into an existing body of knowledge	X	X
uses information in critical thinking and problem solving (Doyle, 1992)	X	X

Doyle's Attributes	National Standards for Social Studies	
An information literate person is one who:	Standard 3 - High School Social studies programs should include experiences that provide for the study of people, places, and environments so that the learner can describe, differentiate, and explain the relationships among various regional and global patterns of geographic phenomena such as landforms, soils, climate, vegetation, natural resources, and population (p.35).	Standard 6 - Early Grades Social studies programs should include experiences that provide for the study of how people create and change structures of power, authority, and governance, so that the learner can: identify and describe factors that contribute to cooperation and cause disputes within and among groups and nations (p.39).
recognizes that accurate and complete information is the basis for intelligent decision making		
recognizes the need for information		
formulates questions as information needs		
identifies potential sources of information		
develops successful search strategies		
accesses sources of information including computer-bases and other technologies		
evaluates information	X	X
organizes information for practical application	X	X
integrates new information into an existing body of knowledge	X	X
uses information in critical thinking and problem solving (Doyle, 1992)	X	X

Doyle's Attributes	National Standards for Civics and Government	
An information literate person is one who:	Content Standard 4, Grades 9-12: Students should be able to: evaluate current criticisms of campaigns and proposals for their reform (p.119).	Content Standard 2, Grades 5-8: Students should be able to: evaluate the influence of television, radio, the press, newsletters and emerging means of electronic communication on American politics (p.69).
recognizes that accurate and complete information is the basis for intelligent decision making	X	X
recognizes the need for information	X	X
formulates questions as information needs		
identifies potential sources of information	X	
develops successful search strategies	X	
accesses sources of information including computer-bases and other technologies	X	X
evaluates information	X	X
organizes information for practical application	X	X
integrates new information into an existing body of knowledge	X	X
uses information in critical thinking and problem solving (Doyle, 1992)	X	X

appendix
F

Dalbotten's Correlation of Inquiry Skills to National Content Standards

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Dalbotten, M. S. (1998). Inquiry in the national content standards. In Callison, McGregor, and Small, *Instructional interventions for information use*. Proceedings of the Treasure Mountain Research Retreat VI, Troutdale, OR, March 31-April 1, 1997. Reprinted with permission from the author.

Note: Dalbotten's work examines all 12 National Content Standards and cross correlates them with Minnesota's Inquiry Process and the Big6™ Skills.

Appendix F presents three of these cross correlations—English/Language Arts, Geography and History.

	Inquiry in general* **Information Problem-Solving****	**Generate Questions*** **Task Definition****	**Determine Feasibility*** **Information Seeking****
English/ Language Arts Source: National Council of Teachers of English. (1996) *Standards for the English Language Arts.* Urbana, IL: Author	Students need to be able to use language to pose significant questions, to become informed, to obtain and communicate information, and to think critically and creatively. p. 18	Use language to **pose significant questions**, to become informed, to obtain and communicate information, and to think critically and creatively. p. 18 Pose questions as they read, listen, and view: e.g. What inferences can I draw from this text? p. 21	Use language to pose significant questions, to **become informed,** to obtain and communicate information, and to think critically and creatively. p. 18
	Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate and synthesize data from a variety of sources (e.g. print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience. p. 25	Conduct research on issues and interests by generating ideas and questions, and by posing problems. p. 25	**Gather,** evaluate and synthesize **data** from a variety of sources (e.g. print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience. p. 25
	Students use a variety of technological and informational resources (e.g. libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge. p. 25		Use a variety of technological and informational resources (e.g. libraries, databases, computer networks, video) to **gather** and synthesize **information** and to create and communicate knowledge. p. 25

Collect Data* **Location & Access****	Reduce & Organize Data* **Information Use****	Display Data* **Synthesis****	Compile Conclusions/ More Questions* **Evaluation****
Use language to pose significant questions, to become informed, **to obtain** and communicate **information**, and to think critically and creatively. p. 18	Use language to pose significant questions, to become informed, to obtain and **communicate information,** and to think critically and creatively. p. 18	Use language to pose significant questions, to become informed, to obtain and communicate information, and **to think critically and creatively.** p. 18 Use a wide range of strategies (including ... synthesizing) to interpret and create various types of texts. p. 20	Provide informed opinions about texts they encounter, and to support their interpretations with multiple forms of evidence. p. 21
Gather, evaluate and synthesize **data** from a variety of sources (e.g. print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience. p. 25	Gather, **evaluate** and synthesize **data** from a variety of sources (e.g. print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience. p. 25	Gather, evaluate and **synthesize data** from a variety of sources (e.g. print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience. p. 25	Gather, evaluate and synthesize data from a variety of sources (e.g. print and non-print texts, artifacts, people) to **communicate their discoveries in ways that suit their purpose and audience.** p. 25
		Use a variety of technological and informational resources (e.g. libraries, databases, computer networks, video) to gather and **synthesize information** and to create and communicate knowledge. p. 25	Use a variety of technological and informational resources (e.g. libraries, databases, computer networks, video) to gather and synthesize information and **to create and communicate knowledge.** p. 25

	Inquiry in general* **Information Problem-Solving****	**Generate Questions*** **Task Definition****	**Determine Feasibility*** **Information Seeking****
Geography Source: Bednarz, S. W. and others. *Geography for life: national geography standards, 1994.* Washington, DC: Department of Education, National Endowment for the Humanities, and the National Geographic Society.	The Five Sets of Geographic Skills 1. Asking Geographic Questions 2. Acquiring Geographic Information 3. Organizing Geographic Information 4. Analyzing Geographic Information 5. Answering Geographic Questions. p. 54	Skill Set 1 Asking Geographic Questions Plan and organize a geographic research project (e.g. specify a problem, pose a research question or hypothesis and identify data sources) (Grades 9-12). p. 54	Skill Set 2 Acquire Geographic Information Systematically locate and gather geographic information from a variety of primary and secondary sources (Grades 9-12). p. 54
	The Five Sets of Geographic Skills 1. Asking Geographic Questions 2. Acquiring Geographic Information 3. Organizing Geographic Information 4. Analyzing Geographic Information 5. Answering Geographic Questions. p. 54		

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Collect Data* Location & Access**	Reduce & Organize Data* Information Use**	Display Data* Synthesis**	Compile Conclusions/ More Questions* Evaluation**
Skill Set 2 Acquire Geographic Information	Skill Set 2 Acquire Geographic Information	Skill Set 3 Organize Geographic Information	
Systematically locate and gather geographic information from a variety of primary and secondary sources (Grades 9-12). p. 54	Systematically assess the value and use of geographic information (Grades 9-12). p. 54	Select and design appropriate forms of maps to organize geographic information (Grades 9-12). p. 54	
		Select and design appropriate forms of graphs, diagrams, tables, and charts to organize geographic information (Grades 9-12). p. 54	
		Use a variety of media to develop and organize integrated summaries of geographic information (Grades 9-12). p. 54	
		Skill Set 4 Analyze Geographic Information	Skill Set 5 Answer Geographic Questions
		Use quantitative methods of analysis to interpret geographic information (Grades 9-12). p. 54	Formulate valid generalizations from the results of various kinds of geographic inquiry (Grades 9-12). p. 54
		Make inferences and draw conclusions from maps and other geographic representations (Grades 9-12). p. 54	Evaluate the answers to geographic questions (Grades 9-12). p. 54
		Use the processes of analysis, synthesis, evaluation, and explanation to interpret geographic information from a variety of sources (Grades 9-12). p. 54	Apply geographic models, generalizations, and theories to the analysis, interpretation, and presentation of geographic information (Grades 9-12). p. 54

	Inquiry in general* **Information Problem-Solving****	**Generate Questions*** **Task Definition****	**Determine Feasibility*** **Information Seeking****
Geography Source: Bednarz, S. W. and others. *Geography for life: national geography standards, 1994*. Washington, DC: Department of Education, National Endowment for the Humanities, and the National Geographic Society.	Standard 1 The World in Spatial Terms How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective. p. 144	Standard 1 The World in Spatial Terms Use geographic tools and technologies to **pose and answer questions** about spatial distributions and patterns on Earth by being able to use maps to understand patterns of movement in space and time. p. 145	Standard 1 The World in Spatial Terms Use maps and other geographic representations, tools, and technologies to **acquire**, process, and report **information** from a spatial perspective. p. 144
	Standard 6 Places and Regions How culture and experience influence people's perceptions of places and regions. p. 117		

Collect Data* **Location & Access****	**Reduce & Organize Data*** **Information Use****	**Display Data*** **Synthesis****	**Compile Conclusions/ More Questions*** **Evaluation****
Standard 1 The World in Spatial Terms Use maps and other geographic representations, tools, and technologies to **acquire,** process, and report **information** from a spatial perspective. p. 144	Standard 1 The World in Spatial Terms Use maps and other geographic representations, tools, and technologies to acquire, **process,** and report **information** from a spatial perspective. p. 144	Standard 1 The World in Spatial Terms Use maps and other geographic representations, tools, and technologies to acquire, process, and **report information** from a spatial perspective. p. 144 Show spatial information on geographic representations by being able to construct diagrams or charts to display spatial information (e.g. construct a bar graph that compares the populations of the five largest cities in a U.S. state). p. 109	
Standard 6 Places and Regions Compare the different ways in which people view and relate to places and regions by being able to **conduct interviews to collect information** on how people of different age, sex, or ethnicity view the same place or region,... then organize the information by subject (e.g. medical facilities) type of interviewee (e.g. Africa-American male teenager) and response. p. 117	Standard 6 Places and Regions Compare the different ways in which people view and relate to places and regions by being able to conduct interviews to collect information on how people of different age, sex, or ethnicity view the same place or region,... then **organize the information** by subject (e.g. medical facilities) type of interviewee (e.g. Africa-American male teenager) and response. p. 117		

	Inquiry in general* Information Problem-Solving**	Generate Questions* Task Definition**	Determine Feasibility* Information Seeking**
Geography Source: Bednarz, S. W. and others. *Geography for life; national geography standards, 1994*. Washington, DC: Department of Education, National Endowment for the Humanities, and the National Geographic Society.	Standard 18 The Uses of Geography How to apply geography to interpret the present and plan for the future. p. 181		Standard 18 The Uses of Geography Integrate multiple points of view to analyze and evaluate contemporary geography issues by being able to **do research on both the student's own point of view and other people's perceptions** of a controversial social, economic, political, or environmental issue that has a geographic dimension and then write a report on that subject, which includes an informed judgment as to what solution should be implemented. p. 181-2

Collect Data* Location & Access**	Reduce & Organize Data* Information Use**	Display Data* Synthesis**	Compile Conclusions/ More Questions* Evaluation**
	Standard 18 The Uses of Geography Integrate multiple points of view to analyze and evaluate contemporary geography issues by being able to do research on both the student's own point of view and other people's perceptions of a controversial social, economic, political, or environmental issue that has a geographic dimension and then **write a report** on that subject, which includes an informed judgment as to what solution should be implemented. p. 181-2	Standard 18 The Uses of Geography Integrate multiple points of view to analyze and evaluate contemporary geography issues by being able to do research on both the student's own point of view and other people's perceptions of a controversial social, economic, political, or environmental issue that has a geographic dimension and then write a report on that subject, which **includes an informed judgment as to what solution should be implemented.** p. 181-2	

	Inquiry in general* **Information Problem-Solving****	**Generate Questions*** **Task Definition****	**Determine Feasibility*** **Information Seeking****
History Source: National Center for History in the Schools. (1996). *National standards for history.* Los Angeles, CA: Author.	Historical thinking skills that enable students to evaluate evidence; develop comparative and causal analyses, interpret the historical record, and construct sound historical arguments and perspectives on which informed decisions in contemporary life can be based. p. 2	Standard 3: The student engages in historical analysis and interpretation. A. Formulate questions to focus their inquiry and analysis. p. 21	
		Standard 4: The student conducts historical research. A. Formulate historical questions. . . p. 22	

Collect Data* Location & Access**	Reduce & Organize Data* Information Use**	Display Data* Synthesis**	Compile Conclusions/ More Questions* Evaluation**
Standard 2 The student comprehends a variety of historical sources. F. Draw upon data in historical maps... p. 19 G. Draw upon the visual and mathematical data presented in graphs, including charts, tables, pie and bar graphs, etc. p. 19 H. Draw upon the visual data presented in photographs, paintings, cartoons, and architectural drawings in order to clarify, illustrate or elaborate upon information presented in the historical narrative. p. 19-20			
Standard 4: The student conducts historical research. B. Obtain historical data from a variety of sources, including: library and museum collections, historic sites, historical photos, journals, diaries, ...and so on. p. 22	Standard 4: The student conducts historical research. C. Interrogate historical data by ...testing the data source for its credibility, authority and authenticity; and detecting and evaluating bias, distortion, and propaganda by omission, suppression or invention of facts. p. 22	Standard 4: The student conducts historical research. D. Marshal needed information of the time and place in order to construct a story, explanation, or historical narrative. p. 22	

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appendix G

An Explanation of Rubrics and Their Application in Standards Education

The Information Literacy Rubrics are an extension of the Model Information Guidelines (Colorado Department of Education, State Library and Adult Education Office, Colorado Educational Media Association, 1994).

A rubric is a descriptive measurement for defining what a learner should know, and can do. This document was created to define the knowledge and ability of every student in how they:

- Construct meaning from information
- Create a quality product
- Learn independently
- Participate as a group member, and
- Use information and information technologies responsibly and ethically

The rubrics are designed in a *matrix*, or grid of benchmarks which define the information literate student. The far left column contains the Target Indicators, or the individual components of each of the five information literacy guidelines. Each target indicator is followed by four qualities, or key behavior skills to be measured. These are written in student language, beginning with a minimal level of understanding, labeled In Progress, followed by Essential, Proficient, and Advanced. Page 1 is an overview for all five guidelines; pages 2ñ8 address specific benchmarks. The final page is a checklist for a student or teacher which may be used in the assessment process.

It should not be a goal to have each student attempt to achieve the Advanced level in each skill area on each project. Rather, the goal should be to assess students on the key points important to the specific content area task, and understand the process for applying that skill in other curricular work. [Example: In a task involving the knowledge seeking process, the student might first be assessed in determining information needs, and acquiring the information. In a later task, they could be assessed in the organization, processing, and evaluation of the information.]

The ideal application and use of these assessments is in a collaborative curriculum involving the student, teacher, media specialist, and other stake holders in the school environment. These rubrics can be used as written to define information goals for the student, or as a framework for student/teacher-written assessments. They are applicable to all grades and content areas, but only through a cooperative effort between the key players will they be truly effective in ensuring student buy-in to understanding the information literacy process.

Knowing how to apply these skills is necessary for successful living in the twenty-first century and beyond.

Target Indicators	In Progress	Essential	Proficient	Advanced
Student as a Knowledge Seeker	• I need someone to tell me when I need information, what information I need, and help me find it.	• Sometimes I can identify my information needs. I ask for help finding and using information.	• I am able to determine when I have a need for information. I often solve problems by using a variety of information resources.	• I know my information needs. I am confident that I can solve problems by selecting and processing information.
Student as a Quality Producer	• Someone else sets the standards and I try to create a product to meet them.	• I may need help understanding what makes a good product, and support to create it.	• I compare my work to models and use them as an example for my product.	• I hold high standards for my work and create quality products.
Student as a Self-Directed Learner	• I have trouble choosing my own resources and I like someone to tell me the answer.	• I might know what I want, but need to ask for help in solving information problems.	• I choose my own resources and like being independent in my information searches.	• I like to choose my own information resources. I am comfortable in situations where there are multiple answers as well as those with no answers.
Student as a Group Contributor	• I need support to work in a group. I have trouble taking responsibility to help the group.	• I usually participate with the group. I offer opinions and ideas, but can not always defend them. I rely on others to make group decisions.	• I participate effectively as a group member. I help the group process, and evaluate and use information with the group.	• I am comfortable leading, facilitating, negotiating, or participating in a group. I work with others to create a product that fairly represents consensus of the group.

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Target Indicators	In Progress	Essential	Proficient	Advanced
Student as a Responsible Information User	• If I find information I can use I copy it directly. I need to be reminded about being polite and about sharing resources and equipment with others.	• I usually remember to give credit when I use someone else's ideas. It is okay for others to have different ideas from mine. I try to be polite and share information resources and equipment with others.	• I do not plagiarize. I understand the concept of intellectual freedom. I am polite and share resources and equipment with others.	• I follow copyright laws, and help others understand the concept of intellectual freedom. I can defend my rights if challenged. I acknowledge and respect the rights of others to use information resources and equipment.
Determines Information Needs	• I need someone to tell me the topic and what information I need.	• I need someone to define the topic. I can identify, with help, some of the information I need.	• I determine a topic and identify the information I need.	• I determine a manageable topic and identify the kinds of information I need to support the topic.
Develops Information Seeking Strategies and Locates Information	• Someone else selects the information resources I need and shows me how to find the information. • Someone else develops my plan and timeline. • I do not know what to record when doing research, nor what bibliographic information is.	• I select resources but they are not always appropriated. • I have an incomplete plan. I have a timeline, but don't always stick to it. • I return to the same source to find the bibliographic details.	• I use a variety of information strategies and resources. • I have a complete plan and stay on my timeline. • I sometimes record bibliographic information.	• I always select appropriate strategies and resources. • I have a complete plan and can adjust my timeline when needed. • I always record bibliographic information for all my sources.
Acquires Information	• I don't understand how to use information resources. • Someone helps me extract details from information.	• I do not use a variety of information resources. • I can extract details and concepts from one type of information resource.	• I prefer to limit the number of information resources I use. • I extract details and concepts from different types of resources.	• I am comfortable using various information resources. • I extract details and concepts from all types of resources.
Analyzes Information	• I have no way to determine what information to keep, and what to discard. • Someone helps me decide what information to use.	• I sometimes apply appropriate criteria to decide which information to use. • I don't always know what criteria to use.	• I examine my information and apply criteria to decide what to use. • I usually know what criteria to use.	• I effectively apply criteria to decide what information to use. • I can match criteria with needs.

Target Indicators	In Progress	Essential	Proficient	Advanced
Organizes Information	• I try to organize information, but have trouble and have to ask for help. • I need to be reminded to credit sources.	• I know some ways to organize information. I can use one or two very well. • Sometimes I credit sources appropriately.	• I organize information in different ways. • I usually credit sources appropriately.	• I choose to organize information in a way that matches my learning style and/or to best meet my information needs. • I always credit sources appropriately.
Processes Information	• I put information together without processing it.	• I combine information to create meaning. I draw conclusions.	• I integrate information from a variety of sources to create meaning that connects with prior knowledge. I can draw conclusions on my own from my sources.	• I integrate information to create meaning that connects with prior knowledge and draw clear and appropriate conclusions. I provide specific and supportive details.
Acts on Information	• I am not sure what actions to take based on my information needs. • I ask for help to find everything I need.	• I know what to do with the information I find. • Some of the information I find is appropriate to my needs.	• I act based on the information I have collected and processed. • I do this in a way that is appropriate to my needs.	• I act independently of the information I have collected and processed. • I do this in a way that is appropriate to my needs. I can explain my actions so that others understand.
Evaluates Process and Product	• I don't know how I did. I need someone to help me figure out how to improve.	• I know how ell I did and have a few ideas on how to improve next time.	• I know when I've done a good job, and know when there are things I could have done better. I make some revisions.	• I evaluate the product and the process throughout my work, and make revisions when necessary.
Recognizes Quality and Craftsmanship	• I need help understanding what makes a good product, and how to create it.	• I look at the available products and sometimes see what is needed to create my own.	• I look at several products, evaluate them and know what I need to do.	• I look at several products provided to me by my instructor, critique them, and see ways to make a better product.

Target Indicators	In Progress	Essential	Proficient	Advanced
Plans the Quality Product	• I need help to understand the steps needed to plan my work. I like someone to help me with each step in completing the product.	• I need to be shown the steps to make my plan, and then can work on my own.	• I know the steps necessary for completing my product and make a plan to complete it.	• I create a process and a timeline (with a back-up plan) for all the steps needed to complete my product.
Creates a Quality Product	• I need help to find which sources to use. I don't know how to use the facts to solve the problem. I have trouble creating the product.	• I use the minimum sources assigned. I just list the facts. I always use the same sources for other work.	• I create and improve my product by using a variety of resources from the media center or school.	• I compare and contrast facts from a variety of sources available both in and out of my community. I am comfortable using various media for products and audiences. I discover new sources on my own.
Presents a Quality Product	• My product is incomplete. I don't revise.	• I complete, but need help with revisions to my product.	• I complete, practice, and revise my product.	• I complete, practice, and revise my product several times. I ask others to give me feedback.
Evaluates Quality Product	• I don't know how to make my product better.	• I need help to understand the best part of my product, and what could have been improved.	• I understand why my product is good, and what could make it better.	• I exceed my expectations when producing and improving a quality product.
Voluntarily Establishes Clear Information Goals and Manages Progress	• Setting information goals is difficult for me. • I need help from someone to choose what I'm supposed to do. • I work best with problems that have only one answer.	• I can set some information goals by myself. • I can sometimes find what I'm supposed to do on my own. • I see that sometimes there may be more than one solution for any project or problem.	• I almost always set my own information goals. • I can usally find a variety of information resources o achieve those goals. • When there is more than one solution, I choose the appropriate one for my project or problem.	• I can set my own information goals, and choose the best way to achieve them. • I like to explore and evaluate various resources and solutions. I use them to create a new solution to the problem. • I'm comfortable in situations where there are multiple answers, or no "best" answer.

Target Indicators	In Progress	Essential	Proficient	Advanced
Voluntarily Consults Media Sources	• I usually use the easiest source, and only one source.	• I can do what is asked of me, and usually find answers to questions after consulting a few sources.	• I understand how different sources are organized, and look for the ones that best meet my needs.	• I look at may different sources to find those that meet my needs. I consider various point-of-view and the merits of the resources before choosing those that work best for me.
Explores Topics of Interest	• I have trouble enjoying my reading, and have a hard time staying with a book – or other reading material. • I tend to over-use certain information resources to the exclusion of others when I do read. • I have trouble exploring new topics. Someone needs to help me get started.	• I enjoy reading certain types of books and other information resources. • I usually read only about one subject, or stay with one author's work. • I explore new topics when required.	• I like reading several different types of literature. • I enjoy reading in a variety of formats (e.g. books, CD-ROM, and other media). • I read to explore and learn about a variety of topics.	• Reading is very important to me, and I enjoy reading and exploring may different topics. • I use information resources for information and personal needs, and actively seek answers to questions. • I consider alternative perspectives and evaluate differing points-of-view. • I read for pleasure, to learn, and to solve problems.
Identifies and Applies Personal Performance Guidelines	• I just do what I'm told. Someone tells me if it's good or not.	• I know when I've done a good job.	• I know when I've done a good job, and know why I was successful. I am satisfied with the results.	• I know how I learn best, and can choose the method(s) which guarantees my success. I can evaluate what I've done. I'm not always satisfied with my results.
Helps Group to Determine Information Needs	• I do not participate constructively in a group. • I sometimes distract the group. • I rely on others to decide what information is needed.	• I usually participate to determine the information needs of the group.	• I am willing to do what is needed to help determine the information needs of the group.	• I assume my appropriate role in the group. • I am comfortable leading, facilitating, negotiating, or participating in defining the information needs of the group.

Target Indicators	In Progress	Essential	Proficient	Advanced
Shares Responsibility for Planning and Producing a Quality Product	• I am not a part of the group, and/or rarely take responsibility to help plan the group's information needs.	• I help define the jobs, and assume some responsibility in assisting and task completion.	• I help to define jobs, and am actively responsible in helping to complete the task.	• I help the group go beyond the basic resources. • I am responsible for helping synthesize the ideas into a finished product.
Collaborates to Determine Relevant Information	• I have trouble participating in a group, or take over and don't listen to the ideas of others.	• I sometimes participate in selecting, organizing, and integrating information for some sources.	• I work with others to select, organize, and integrate information from a variety of sources.	• I actively work with others and help the group select, organize, and integrate information from a variety of sources.
Acknowledges Diverse Ideas and Incorporates them When Appropriate	• I need support to work in a group. I often do not respect input from others.	• I show respect for the ideas of others.	• I encourage team members to share ideas.	• I respect and help the group find and incorporate diverse ideas.
Offers Useful Information to the Group, Defends Information When Appropriate, and Seeks Consensus to Achieve a Stronger Product	• I sometimes make the group's progress difficult.	• I offer information or ideas, but am unable to defend my own ideas, or those of others.	• I offer and defend information that is brought to the group.	• I offer useful information to the group, defend that information when appropriate, and seek consensus to achieve a stronger product.
Clearly Communicates Ideas in Presenting the Group Product	• I choose not to participate in the presentation, or am unprepared to make a good presentation. • Sometimes I am disruptive.	• I help in presenting the group product.	• I contribute to the group and demonstrate the ability to use a variety of presentation methods.	• I work hard in assuring that all contributions from the group are included in the final product. • I help the group present effectively using a variety of media.
Evaluates Product, Process, and Individual Roles Continuously	• I don't work with a group and am not certain how to evaluate the process or product.	• I evaluate my own role, but need support to apply certain criteria to the group product. • I am more comfortable allowing others to do the work.	• I effectively evaluate my own role and the roles of others. • I continuously apply appropriate evaluation criteria to the group product.	• I work with the group to evaluate roles, and apply appropriate evaluation criteria to process the product. • I suggest improvements for the next project.

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Target Indicators	In Progress	Essential	Proficient	Advanced
Practices Ethical Usage of Information and Information Sources	• I don't give credit to others when I use their information. • I don't know why some things need quote marks, and have trouble putting information in my own words. • I don't know why I can't use other people's work (from books, or other information resources).	• I can usually put information in my own words. • If I use someone else's words, I usually remember to put them in quotes. • I can create a bibliography to credit my sources, and don't copy other people's work. • I know it's against the law to copy computer disks, tapes, or other materials.	• I follow copyright laws and guidelines by giving credit to all quotes and ideas, citing them in notes and bibliography properly. • I only make copies of print, software, or tapes when I can located permission from the author/publisher, or by locating permission on the materials.	• I understand and appreciate that copyright protects the creator of the resource, so I always follow and uphold copyright regulations. • I do not plagiarize. • I cite all my sources by following a format demonstrated to me by a teacher or other source. • When I need to copy something, I know how to, and do get permission from the copyright holder.
Respects Principle of Intellectual Freedom	• I usually don't pay attention to what others read, listen to, or view, and sometimes react inappropriately to them.	• I don't try to keep someone from expressing their own ideas, nor reading, listening to, or viewing what they want.	• I understand it is important to have many and differing perspectives on a subject. • I know I have the right to express my opinion, and usually offer my opinion in an appropriate manner.	• I can explain my First Amendment rights, and if challenged, know the process available to me to defend those rights. • I promote the rights of others, and defend them as well.
Follows Guidelines and Etiquette when Using Electronic Information Resources	• Someone tells me how to use the information resources, and works with me to get the information I need. • I spend so much time using the resources that I deny access for others. • I need to be reminded of the guidelines for using electronic resources responsibly.	• I have been trained to use electronic resources, can use them with minimal supervision, and can usually get the information I need without help. • I share electronic resources and try to follow appropriate guidelines for their use.	• I get the information I need in a reasonable amount of time so others can also use the materials. • I follow guidelines for the use of information resources and use them efficiently.	• I serve as a mentor for others who want to learn how to use electronic resources. • I use my skills to promote positive and ethical uses of those resources. • I use materials and equipment fairly and carefully.

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Target Indicators	In Progress	Essential	Proficient	Advanced
Maintains the Physical Integrity of Information Resources and Facilities	• I know that information resources/facilities have rules and consequences, and sometimes I follow those rules.	• I usually follow the rules in my school for use of information resources, and accept the consequences when I occasionally break a rule. • I never intentionally cause damage to any materials or equipment.	• I respect the rights of others by following the rules, and never intentionally keep materials from being available to them. • I tell someone immediately about any damage I cause or discover.	• I appreciate the many resources and facilities that are available to me. • I help others follow the rules for the use of equipment and materials. • I use materials fairly, carefully, and equitably. • I suggest new rules when appropriate.
Recognizes the Need for Equal Access to Materials and Resources	• I use some information resources. • Sometimes I only use items from home or my classroom, but might go to the library media center during a scheduled class time. • I don't care if someone else needs to use the information I have. • I don't like to share.	• I go to the library media center when I need information resources. • When my library doesn't have what I need, I know I can ask the media specialist/librarian to help me find it from another source.	• I know it is important for others to have access to information resources, so I usually return items when they are due. • When I need other materials that are not in my school, I look for them on ACLIN, or other suitable networks, and work with my library media specialist to borrow from other sources.	• I use several libraries and on-line sources when necessary and appropriate to find information I need. • I share resources with others when it is helpful. • I follow the rules in all buildings, including returning all materials on time.

INFORMATION LITERACY GUIDELINES

Students as Knowledge Seekers . . .

- Decide what information is needed.
- Develop a plan.
- Locate information.
- Analyze information to see if it's useful.
- Combine information from different sources.
- Do something with the information.
- Evaluate the results.

Students as Quality Producers . . .

- Understand what a quality product is.
- Plan quality products.
- Create quality products.
- Present quality products.
- Evaluate quality products.

Students as Self-Directed Learners . . .

- Set goals.
- Read for pleasure.
- Use media sources for information and personal needs.
- Seek answers to question.
- Explore topics of interest.
- Ask for help.

Students as Group Contributors . . .

- Work together to plan a project.
- Decide together what information is needed.
- Respect the ideas of others and include different points of view.
- Offer useful information to the group.
- Clearly communicate ideas.
- Help evaluate the group project.

Students as Responsible Information Users . . .

- Don't copy information.
- Give credit to sources.
- Understand others rights to choose own reading materials.
- Allow others to have access to electronic sources.
- Take care of materials.

Barbara Higgens, South Middle School, Aurora Public Schools (1995)

Guidelines Checklist

Information Literacy Rubrics	In Progress	Essential	Proficient	Advanced
Guideline 1: Students as Knowledge Seekers				
• Decide what information is needed.				
• Develop a plan.				
• Locate information.				
• Analyze information to see if it's useful.				
• Combine information from different sources.				
• Do something with the information.				
• Evaluate the results.				
Guideline 2: Students as Quality Producers				
• Understand what a quality product is.				
• Plan quality products.				
• Create quality products.				
• Present quality products.				
• Evaluate quality products.				
Guideline 3: Students as Self-Directed Learners				
• Set goals.				
• Read for pleasure.				
• Use media sources for information and personal needs.				
• Seek answers to question.				
• Explore topics of interest.				
• Ask for help.				
Guideline 4: Students as Group Contributors				
• Work together to plan a project.				
• Decide together what information is needed.				
• Respect the ideas of others and include different points of view.				
• Offer useful infor-mation to the group.				
• Clearly communicate ideas.				
• Help evaluate the group project.				
Guideline 5: Students as Responsible Information Users				
• Don't copy information.				
• Give credit to sources.				
• Understand others' rights to choose own reading materials.				
• Allow others to have access to electronic sources.				
• Take care of materials.				

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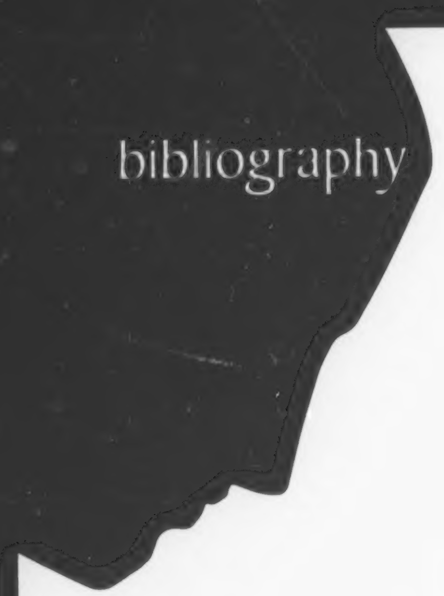


bibliography

1997 Campus Computing Survey. In ADEC (1997, November 12). *Use of technology in college expands.* [Online]. Available: *http://www.adec.edu/user/current/campus_computing.html* [1998, March 28]

America 2000. (1991, December). *Congressional Digest, 70*(12), 294-295.

American Association of School Librarians and Association for Educational Communications and Technology. (1988). *Information power: Guidelines for school library media programs.* Chicago: Author. (ED 315 028)

American Association of School Librarians and Association for Educational Communications and Technology National Guidelines Vision Committee.(1996, October). *Information literacy standards for student Learning.* [Online]. Available: *http://www.ala.org/aasl/stndsdrft5.html* [1998, March 15].

American Library Association Presidential Committee on Information Literacy. (1989). *Final report.* Chicago: Author. (ED 316 074)

American Library Association. (1998). Information literacy standards for student learning. In *Indicators for Schools of Quality.* [Online]. Available: *http://www.ala.org/aasl/news/indicators1.html* [1998, February 20].

American Library Association and Association for Educational Communications and Technology. (1998). *Information power: Building partnerships for learning.* Chicago: Author.

Annenberg/CPB Projects. (1997). *Journey North.* [Online]. Available: *http://www.learner.org/jnorth/jnorth.html* [1998, March 21].

Association for Supervision and Curriculum Development. In Doyle, C. S. (1994). *Information literacy in an information society: A concept for the information age.* Syracuse, NY: ERIC Clearinghouse on Information and Technology.

Association for Teacher-Librarianship in Canada and Canadian School Library Association. (1997, November). *Students information literacy needs in the 21st century: Competencies for teacher-librarians.* [Online]. Available: *http://www.sbe.saskatoon.sk.ca/~atlc/competen.htm* [1998, April 16].

Association for Teacher-Librarianship in Canada. (1995). *Students' bill of information rights.* [Online.] Available: *http://www.sbe.saskatoonlsk.ca/~atlc/studrigh.htm* [1998, April 17].

Aufderheide, P. (1993). *Media literacy. A report of the national leadership conference on media literacy.* Aspen Institute, Queenstown, MD. (ED 365 294)

Australian Library and Information Association. (1997, March). *Information literacy task force.* [Online]. Available: *http://www.alia.org.qu/gc/committees/information.literacy/home.html* [1998, April 4].

Australian School Library Association. (1994). *Learning for the future: Developing information services in Australian schools.* Carlton: Curriculum Corporation.

Barner, R. (1996, March/April). Seven changes that will challenge managers–and workers. *The Futurist, 30*(2), 14-18.

Barrows, H. S. (1996, Winter). Problem-based learning in medicine and beyond: A brief overview. *New Directions for Teaching and Learning, 68,* 3-12. (EJ 535 963)

Beck, S. E. (1998, Jan. 14). LSC 311-02 *Information literacy.* [Online]. Available: *http://nosferatu.cas.usf.edu/lis/it/programs.html* [1998, January 16].

Behrens, S. J. (1994, July). A conceptual analysis and historical overview of information literacy. *College and Research Libraries,* 55(4), 309-322. (EJ 486 800)

Bellingham Schools. (1996, October 23). *Bellingham Schools course outline: Information literacy and the net.* [Online]. Available: *http://www.bham.wednet.edu/lessons.htm* [1998, March 29].

Bellingham Schools (1996, September 4). *Lesson plans.* [Online]. Available: *http://www.bham.wednet.edu/lessons.htm* [1998, March 29].

Bentley, M. (1997, October). User education at NYPL's new SIBL. *College & Research Libraries News, 58*(9), 633-636.

Bloom, B. S. (1956). *Taxonomy of educational objectives: The classification of educational goals: Handbook I: Congitive domain.* New York: McKay.

Braden, R. A., & Hortin, J. A. (1982). Identifying the theoretical foundations of visual literacy. *Journal of Visual/Verbal Languaging,* 2, 37-42.

Brandt, D. S. (1998, January 14). *Syllabus. Information strategies.* [Online]. Available: *http://thorplus.lub.purdue.edu/library_info/instruction/gs175/Spring98/1gs175e/*

Breivik, P. S. (1998). *Student learning in the information age.* Phoenix, AZ: Oryx Press.

Breivik, P. S. & Gee, E. G. (1989). *Information literacy.* NY: Macmillan Publishing Co.

Breivik, P. S., Hancock, V. & Senn, J. (1998). *A progress report on information literacy: An update on the American Library Association Presidential Committee on information literacy: Final Report.* Chicago: ALA, Association of Research Librarians. pp. 1-10.

Breivik, P. S. & Senn, J. A. (1994). *Information literacy: Educating children for the 21st century.* New York: Scholastic Inc. (ED 373 801).

Breivik, P. S. & Senn, J. A. (1998). *Information literacy: Educating children for the 21st century.*(2nd ed.). Washington, DC: National Education Association.

Breivik, P. S. & Wedgeworth, R. (1988). *Libraries and the search for academic excellence.* Metuchen, NJ: Scarecrow Press.

Bruce, C. (1997). *The seven faces of information literacy.* Adelaide (AU): Auslib Press.

Burchinal, L. G. (1976, Sept. 24). The communications revolution: America's third century challenge. In *The future of organizing knowledge.* Papers presented at the Texas A & M University library's centennial academic assembly, Sept. 12, 1976. College Station, TX: Texas A & M University.

California Academic and Research Libraries Task Force. (1997, September 29). *Draft recommendations to WASC on an information literacy standard.* [Online]. Available: *http://www.carl-acrl.org/Reports/rectoWASC.html* [1998, January 18].

California Department of Education. (1994). *Information literacy guidelines.* Denver, CO: Author.

California Media and Library Educators Association. (1994). *From library skills to information literacy: A handbook for the 21st century.* Castle Rock, CO: HiWillow Research and Publishing.

Callison, D. (1993). The potential for portfolio assessment. In C.C. Kuhlthau (Ed.), *School Library Media Annual,* (pp. 30-39). Englewood, CO: Libraries Unlimited, Inc.

Callison, D., McGregor, J. H. & Small, R. (Eds.). *Instructional intervention for information use.* Research papers of the sixth Treasure Mountain research retreat for school library media programs. March 31-April 1, 1997. San Jose, CA: Hi Willow Research and Publishing.

Carpenter, J. P. (1989). *Using the new technologies to create links between schools throughout the world: Colloquy on computerized school links.* (Exeter, Devon, United Kingdom, 17-20 October 1988).

Carrier Library, James Madison University Library. (Undated). *Welcome to go for the gold.* [Online]. Available: *http://library.jmu.edu/library/gold/modules.htm* [1998, March 16].

Center for Applied Special Technology. (1996). *The role of online communications in schools: A national study.* [Online]. Available: *http://www.cast.org/stsstudy.html#RESULTS* [1998, March 27].

Center for Civic Education. (1994). *National standards for civics and government.* Calabass, CA: Center for Civic Education.

Colorado Department of Education. (1994). *Model information literacy guidelines.* Denver, CO: Author. (ED 373 797)

Colorado Educational Media Association. (1994). *Model information literacy guidelines.* Colorado State Dept. of Education, Denver: State Library and Adult Education Office.

Colorado State Dept. of Education. (1996). *Rubrics for the assessment of information literacy.* Denver, CO. (ED 401 899)

Commission on Higher Education. (1995). Middle States Association of Colleges and Schools. *Information literacy, lifelong learning in the middle states region.* A summary of two symposia. Philadelphia: Middle States Association.

Consortium of National Arts Education Associations. (1994). *National standards for arts education.* Reston, VA: Music Educators National Conference.

Corporation for Public Broadcasting. (1997). *Study of school uses of television and video.* [Online]. Available: *http://www.cpb.org/library/schoolusestudy/sus12.html* [1998, February 26].

Cortes, C. E. (1992, August). Media literacy: An educational basic for the information age. *Education and Urban Society, 24*(4), 489-497. (EJ 449 523)

Costa, A. L. (1993, February). How world-class standards will change us. *Educational Leadership, 50*(5), 50-51. (EJ 457 363)

Cowles, S. K. (1997). *Warming up: Summary information.* [Online]. Available: *http://novel.nifl.gov/susanc/ago tine.htm#Projectdescription* [1998, March 31].

CTAP Region VII Information Literacy Task Force. (Undated). *CTAP information literacy guidelines K-12.* [Online]. Available: *http://ctap.fcoe.k12.ca.us/ctap/Info.Lit/Guidelines.html* [1998, March 29].

CTAP Region VII Information Literacy Task Force. (Undated). *Information literacy development.* [Online]. Available: *http://ctap.fcoe.k12.ca.us/ctap/Info.Lit/Benchmarks.html* [1998, March 29].

Cuban, L. (1990). Four stories about national goals for American education. *Phi Delta Kappan, 72*(4), 264-271. (EJ 418 152)

Curzon, S. (1997). *Information competence. A set of core competencies.* [Online]. Available: *http://www.csun.edu/ITR/library/scurzon/corecomp.html* [1998, January 23].

Curzon, S. (1997). *Information competence. Memorandum.* [Online]. Available: *http://www.csun.edu/ITR/library/scurzon/Infocmem.html* [1998, January 23].

Dalbotten, M. S. (1998). Inquiry in the national content standards. In Callison, McGregor, and Small, *Instructional interventions for information use.* Proceedings of the Treasure Mountain Research Retreat VI, Troutdale, OR, March 31-April 1, 1997.

Developing lifelong learners through undergraduate education, Commissioned Report No. 28, National Board of Employment, Education and Training. (August, 1994). P. C. Candy, G.Crebert, & J. O'Leary (Eds.). Australian Government Publishing Service, iii.

*Division of Reference Services, Olin*Kroch* Uris Libraries, Cornell University Library.* (1997, September 1). *Library research at Cornell: A hypertext guide.* [Online]. Available: *http://www.library.cornell.edu/okuref/research/tutorial.html* [1998, March 16].

Doyle, C. S. (1992). *Outcome measures for information literacy within the National Educational Goals of 1990. Final report to National Forum on Information Literacy.* Flagstaff, AZ: National Forum on Information Literacy. (ED 351 033)

Doyle, C. S. (1994). *Information literacy in an information society: A concept for the information age.* Syracuse, NY: ERIC Clearinghouse on Information and Technology. (ED 372 763)

Drucker, P. (1992, December 1). Be data literate–know what to know. *Wall Street Journal,* p. A16.

Drucker, P. F. in Harris, T. G. (1993, May/June). The post-capitalist executive: An interview with Peter F. Drucker. *Harvard Business Review, 71*(3), 114-122.

Eisenberg, M. B. & Berkowitz, R. E. (1988). *Curriculum initiative: An agenda and strategy for library media programs.* Norwood, NJ: Ablex.

Eisenberg, M. B. & Berkowitz, R. E. (1996, June). *Helping with homework: A parent's guide to information problem-solving.* Syracuse, NY: ERIC Clearinghouse on Information & Technology.

Eisenberg, M. B. & Brown, M. K. (1992). Current themes regarding library and information skills instruction: Research supporting and research lacking. *School Library Media Quarterly, 20*(2), 103-109. (EJ 441 731)

Eisenberg, M. B. & Johnson, D. (1996). *Computer skills for information problem solving: Learning and teaching technology in context.* ERIC Digest.. (Report no. EDO-IR-96-04). Syracuse, NY: ERIC Clearinghouse on Information and Technology. (ED 392 463)

Eisenberg, M. B. & Lowe, C. A. (1997). The Big6™ Skills: Looking at the world through information problem-solving glasses. In Callison, McGregor, and Small, *Instructional interventions for information use.* Proceedings of the Treasure Mountain Research Retreat VI, Troutdale, OR, March 31-April 1, 1997.

Eisenberg, M. B. (1996, September). Take the Internet challenge: Using technology in context. *Technology Connection, The Book Report, Library Talk,* (Special supplement).

ETS Policy Information Center. (1997). *Computers and classrooms: The status of technology in U.S. schools 1997.* [Online]. Available at: *http://www.ets.org/research/pic/compclass.html* [18 March, 1998].

Florida International University. (1996, August 4). *Information literacy across the curriculum.* [Online]. Available: *http://nosferatu.cas.usf.edu/lis/il/programs.html* [1998, January 16].

Fulton, K. (1997). *Learning in the digital age: Insights into the issues. The skills students need for technological fluency.* Santa Monica, CA: Milken Family Foundation.

Gallagher, S. A., & Stepien, W. J. (1996, Spring). Content acquisition in problem-based learning: Depth versus breadth in American studies. *Journal for the Education of the Gifted, 19*(3), 257-275. (EJ 527 609)

Gardner, H. (1993, April). In Brandt, R. (1993, April). On teaching for understanding: A Conversation with Howard Gardner. *Educational Leadership, 50*(7), 4-7. (EJ 461 120)

Geography Education Standards Project. (1994). *Geography for life: National geography standards 1994.* Washington, DC: National Geographic Research & Exploration.

Goodin, M. E. (1991). The transferability of library research skills from high school to college. *School Library Media Quarterly.19*(1), 33-42. (EJ 436 241)

Gratch, B. et al. *Information retrieval and evaluation skills for education students.*(ED 351 038).

Griffith University. (1994, September). *Information literacy blueprint.* [Online]. Available: *http://www.gu.edu.au/gwis/ins/infolit/blueprint.htm* [1998, February 9].

Haeckel, S. H., & Nolan, R. L. (1993). The role of technology in an information age. In *Annual Review of the Institute for Information Studies, The Knowledge Economy* (pp. 1-24). Queenstown, MD: Aspen Institute.

Hamilton, M. A., & Hamilton, S. F. (1997, May). When is work a learning experience? *Phi Delta Kappan, 78*(9), 682-689. (EJ 544 327)

Hancock, V. E. (1993). *Information literacy for lifelong learning.* ERIC Digest. (Report no. EDO-IR-93-1). Syracuse NY: ERIC Clearinghouse on Information Resources.

Hashim, E. (1986). Educating students to think: The role of the school library media program, an introduction. In *Information literacy: Learning how to learn.* A collection of articles from *School Library Media Quarterly, (15)*1, 17-18.

Haycock, C. A. (1991, May). Resource-based learning: A shift in the roles of teacher, learner. *NASSP Bulletin, (75)*535, 15-22. (EJ 425 570)

Illinois State Board of Education. (1996). K-12 information technology plan. Springfield, IL: Illinois State Board of Education.

Information competence in the CSU: A report submitted to the Commission on Learning Resources and Instructional Technology (CLRIT) by the CLRIT Information Competence Work Group; revised: 1/97. A set of core competencies. [Online]. Available: *http://www.csun.edu/ITR/library/scurzon/corecomp.html* [1998, January 23].

Information literacy: A position paper of information problem-solving. (1995, Nov/Dec). *Emergency Librarian, 23*(2), 20-23.

Institute for Information Literacy. (18 June 1998). *Institute for information literacy.* Available: *http://www.ala.org/acrl/nili/nilimiss.html* [23 July 1998).

International Reading Association & National Council of Teachers of English. (1996). *Standards for the English language arts.* Newark, Delaware: International Reading Association.

Irving, A. (1985). *Study and information skills across the curriculum.* London: Heinemann Educational Books.

Ives, B., & Jarvenpaa, S. L. (1993). Information: Empowering knowledge networks with information technology. In *Annual Review of the Institute for Information Studies, The Knowledge Economy* (pp. 53-88). Queenstown, MD: Aspen Institute.

Jacobs, V. (1995). All alone and lost in cyberspace: Closing the gap between the local village and the global village through teaching Namibian children information skills and technology. In *Sustaining the vision.* Selected papers from the Annual Conference of the International Association of School Librarianship (24th, Worcester England, July 17-21, 1995). (ED 400 834)

Joint Committee on National Health Standards. (1997). *National health education standards: Achieving health literacy.* Atlanta, GA: American Cancer Society.

Kanter, J. (1996, Spring). Guidelines for attaining information literacy. Information strategy: *The Executives' Journal, 12*(3) 6-11.

Kentucky Department of Education. (1995). *Online II: Essentials of a model library media program.* Louisville, KY: Author.

Kindred Public School. (Undated). *Rain forest portfolio.* [Online]. Available: *http://www.kindred.k12.nd.us/CyLib/rainf.html* [1998, March 30].

Kluger, J. (1997, August 11). Calling all amateurs. *Time, 150*(6), 68.

Krovetz, M., Casterson, D., McKowen, C., & Willis, T. (1993, April). Beyond show and tell. *Educational Leadership, 50*(7), 73-76. (EJ 461 142)

Kuhlthau, C. C. (1987). *Information skills for an information society: A review of research.* Syracuse, NY: ERIC Clearinghouse on Information Resources. (ED 297 740)

Kuhlthau, C. C. (1993). *Seeking meaning: A process approach to library and information services.* Greenwich, CT: Ablex.

Kunde, D. (1997, August 12). Workers struggling to deal with e-mail overload. *Syracuse Herald Journal,* A9.

Lance, K. C., Welborn, L., & Hamilton-Pennell, C. (1992). *The impact of school library media centers on academic achievement.* Denver: Colorado Department of Education. (ED 353 989)

Lazzara, M. & Heinzel, A. (Undated). *Information literacy adventure.* [Online]. Available: *http://prwww.ncook.k12.il.us/LearningCenter/infolit/iladventpage/iladvent.html* [1998, April 3].

Lenox, M. F. & Walker, M. L. (1992). Information literacy: Challenge for the future. *International Journal of Information and Library Research, 4*(1), 1-18.

Mancall, J. C., Aaron, S. L., & Walker, S. A. (1986). Educating students to think: The role of the library media program. A concept paper written for the National Commission on Libraries and Information Science. *School Library Media Quarterly, Journal of the American Association of School Librarians, 15*(1), 18-27. (EJ 344 239)

McClure, C. R. (1993). Network literacy in an electronic society: an educational disconnect? In *Annual Review of the Institute for Information Studies, The Knowledge Economy* (pp. 137-178). Queenstown, MD: Aspen Institute.

Ministry of Education, Helsinki (Finland). (1995). *Education, training, and research in the information society: A national strategy.* Helsinki (Finland). (ED 389 258)

Moore, D. M. & Dwyer, F. M., (Eds.). (1994). *Visual literacy: A spectrum of visual learning.* Englewood Cliffs, NJ: Educational Technology Publications.

National Association for Sport and Physical Education. (1995). *Moving into the future: National standards for physical education.* St. Louis, MO: Mosby Year Book, Inc.

National Center for Education Statistics. (1997, October). *Statistical analysis report: Distance education in higher education institutions.* [Online]. Available: *http://nces.ed.gov/pubs98/distance/index.html* [1998, March 2[illegible]].

National Center for History in the Schools. (1996). *National standards for history.* Los Angeles, CA: Author.

National Commission of Excellence in Education. (1983). *A nation at risk: The imperative for educational reform.* Washington, DC: U.S. Government Printing Office. (ED 226 006)

National Council for the Social Studies. (1989). *From information to decision making: new challenges for effective citizenship.* Washington, DC: Author. (ED 310 956)

National Council for the Social Studies. (1993). Curriculum standards for the social studies, draft 2. Washington, DC: Author.

National Council of Teachers of Mathematics. Commission on standards for school mathematics. (1989). *Curriculum and evaluation standards for school mathematics.* Reston, VA: Author. (ED 304 336)

National Council on Economic Education. (1997). *Voluntary national content standards in economics.* NY: Author.

National goals for education. (1990). Washington, DC: Executive Office of the President. (ED 319 143)

National Research Council. (1993). National science education standards: An enhanced sampler. A working paper of the National Council on Science Education Standards and Assessment. Washington, DC: Author. (ED 360 175)

National Standards in Foreign Language Education Project. (1996). *Standards for foreign language learning: Preparing for the 21st century.* Lawrence, KS: Allen Press, Inc.

New South Wales Department of Education. (Undated). *Information Skills in the School.* New South Wales: Author.

Newmann, F. M. & Wehlage, G. G. (1993, April). Five standards of authentic instruction. *Educational Leadership, 50*(7), 8-12. (EJ 461 121).

North Carolina State University Library. (Undated). Library online basic orientation (LOBO). [Online]. Available: *http://sirius.lib.ncsu.edu/lobo/partone/intro.html* [1998, March 19].

Northeast Elementary School. (1997). *Information literacy standards.* [Online]. Available: *http://franklin.icsd.k12.ny.us/library/infolit.htm* [1998, March 29].

Norton, B. & Gotts, S. The events of October 1987. In, Horton, F. W. Jr., & Lewis, D. (1991). *Great information disasters: Twelve prime examples of how information mismanagement led to human misery, political misfortune and business failure.* London: ASLIB. 107-124.

Oberlin College Library. (1997, July 23). *Faculty workshop on information literacy.* [Online]. Available: *http://www.oberlin.edu/~library/reference/WT97/fac_comm.html.* [1998, January 16].

Oberlin College Library. (1997, June 24). *Winter term 1997 Faculty workshop on information literacy.* [Online]. Available: *http://www.oberlin.edu/~library/reference/WT97/outline.html* [1998, March 16].

Oberlin College. (1998, January). *Using educational technology to teach information literacy.* [Online]. Available: *http://www.oberlin.edu/~OCTET/wtworkshop/* [1998, March 16].

Olen, S. (1995). A transformation in teacher education: Or how can disadvantaged teachers become information literate? In *Literacy: Traditional, cultural, technological.* Selected papers from the Annual Conference of the International Association of School Librarianship (23rd, Pittsburgh, Pennsylvania, July 17-22, 1994). (ED 399 948)

Oregon Educational Media Association. (1997). *Information literacy guidelines: Scientific inquiry.* [Online]. Available: *http://www.teleport.com/~oema/sci.html* [1998, March 28].

Owens, M. R. (1976, Jan. 1). The state government and libraries. *Library Journal, 101*(1), 19-28.

Peck, K. L. & Dorricott, D. (1994, April). Why use technology? *Educational leadership, 51*(7), 11-14. (EJ 508 282)

Pitts, J. et al. (1995). Mental models of information: The 1993-1994 AASL/Highsmith research award study. *School Library Media Quarterly, 23*(3), 177-184. (EJ 503 402)

Port Hope High School Curriculum Leadership Team. (Undated). *Information literacy.* [Online]. Available: *http://www.eagle.ca/~spencerj/big6/bg6index.html* [1998, April 3].

President's Committee of Advisors on Science and Technology Panel on Educational Technology. (1997, March).

Prologue and major recommendations of Carnegie Foundations report on colleges. (1986, November). *Chronicle of Higher Education, 33* (10): 21.

Rader, H. B. (1996). User education and information literacy for the next decade: An international perspective. *Reference Services Review, 24*(2), 71-75.

Ratteray, O. M. & Simmons, H. L. (1995). *Information literacy in higher education: A report on the middle states region.* Philadelphia, PA: Middle States Association of Colleges and Schools. (ED 388 136)

Report to the President on the use of technology to strengthen K-12 education in the United States. [Online]. Available: *http://www.whitehouse.gov/WH/EOP/OSTP/NSTC/PCAST/k-12ed.html* [1998, March 28].

Russell, S. (Undated). *The Big6-Dig it!* [Online]. Available: *http://www.voicenet.com/~srussell/bigsix/digit.html* [1998, March 30].

Savery, J. R., & Duffy, T. M. (1995, September/October). Problem based learning: An instructional model and its constructivist framework. *Educational Technology, 35*(5), 31-38. (EJ 512 183)

Schack, G. D. (1993, April). Involving students in authentic research. *Educational Leadership, 50*(7), 29-31.(EJ 461 127)

SCORE - History-Social Science. (Undated). *Information literacy.* [Online]. Available: *http:www.rims.k12.ca.us/SCORE/Infolit.html* [1998, March 29].

Secretary's Commission on Achieving Necessary Skills. (1991). *What work requires of schools: A SCANS report for America 2000.* Washington, DC: U.S. Government Printing Office. (ED 332 054)

Shapiro, J. J., & Hughes, S. K. (1996, March/April). Information literacy as a liberal art. *Educom Review* [Online]. 3.2. Available: *http://www.educom.edu/web/pubs/review/reviewArticles/31231.html.* [1998, February 16].

Smith, R. L. (1997). *Philosophical shift: Teach the faculty to teach information literacy.* [Online]. Available: *http://www.ala.org/acrl/paperhtm/d38.html* [1998, March 15].

State University of New York (SUNY) Information Literacy Initiative. (1997, October 2). [Online]. Available: *http://olis.sysadm.suny.edu/ili/* [1998, January 16].

Steinke, S. (1997). *Information literacy guidelines. Introduction and context.* Oregon Educational Media Association (OEMA). [Online]. *http://www.teleport.com/~oema/infolit_intro.html* [1998, October 5].

Stripling, B. & Pitts, J. (1988). *Brainstorms and blueprints: Teaching library research as a thinking process.* Littleton, CO: Libraries Unlimited.

Stripling, B. K. (1993). Practicing authentic assessment in the school library. In C.C. Kuhlthau (Ed.). *School Library Media Annual.* (pp. 40-55). Englewood, CO: Libraries Unlimited, Inc. (EJ 476 205).

Task Force of the Pre-College Committee of the Education Board of the ACM. (1997). ACM model high school computer science curriculum. [Online]. Available at: *http://www.acm. org/education/hscur/index.html* [1 March, 1998].

Temple University Libraries. (1997). *Library Skills Workbook.* [Online]. Available: *http://www.library.temple.edu/libinst/lsw.htm* [1998, March 19].

Todd, R. (1995). Integrated information skills instruction: Does it make a difference? *School Library Media Quarterly,* 23(2), 133-139. (EJ 497 921)

Tri-County Technical College. (1998, January 10). *About the program.* [Online]. Available: *http://www.appnet.org/infolit/text/tprogram.htm* [1998, January 16].

United States Department of Education. (1994). *Sec. 102.* [Online]. Available: *http://www.ed.gov/legislation/GOALS2000/TheAct/sec102.html* [1998, April 6].

University Library Cal Poly Pomona. (1995). *Information competence in the CSU: A report.* [Online]. Available: *http://www.csupomona.edu/library/InfoComp/CLRIT.html* [1998, January 16].

University Library Cal Poly Pomona. (Undated). *CSU work group on information competence.* [Online]. Available: *http://www.csupomona.edu/library/InfoComp/home.html* [1998, January 16].

University of Arizona Library. (1996). *Information literacy project: Project charge.* [Online]. Available: *http://dizzy.library.arizona.edu/infolit/CHARGE.HTM* [1998, March 16].

University of Arizona Library. (1996). *Information literacy project. Information literacy defined.* [Online]. Available: *http://dizzy.library.arizona.edu/Infolit/DEFINE.HTM* [1998, January 16].

University of Arizona Library. (Undated). *Descriptions of information Literacy efforts at other universities.* [Online]. Available: *http://dizzy.library.arizona.edu/infolit/DESCRIPT.HTM* [1998, March 16].

University of Arizona Library. (Undated). *Librarian–Faculty teaching technology partnerships.* [Online]. Available: *http://www.library.arizona.edu/partnerships/* [1998, March 16].

University of Arizona Library. (Undated). *Librarian–Faculty teaching technology partnerships. History 436.* [Online]. Available: *http://dizzy.library.arizona.edu/partnerships/hist436cf.htm* [1998, March 16].

University of Ballarat Library. (1997). *Information literacy.* [Online]. Available: *http://www.ballarat.edu.au/branches/is/ej/infolit/infolit.htm.* [1998, February 9].

University of Calgary Information Literacy Group. (Undated). *Information literacy definition.* [Online]. Available: *http://www.ucalgary.ca/library/ILG/workdef.html.* [1998, January 16].

University of California at Berkeley Library, (1997, June 24). *Internet resources.* [Online]. Available: *http://library.berkeley.edu/TeachingLib/Guides/Internet/* [1998, August 2].

University of Louisville Office of Information Literacy. (1998, March 3). *Lifelong learning through the libraries.* [Online]. Available: *http://www.louisville.edu/infoliteracy/* [1998, March 16].

University of Massachusetts, Dartmouth. (1997, June 10). *Information literacy project: Defining competencies.* Available: *http://www2.lib.umassd.edu/library2/INFOLIT/Infolit.html* [1998, January,16].

University of Wisconsin-Parkside Library/Learning Center. (1997). *Welcome to the information literacy program.* [Online]. Available: *http://www.uwp.edu/library/toc.html* [1998, January 16].

University of York. (1997, November). *ILIAD–Gateway to information literacy.* [Online]. Available: *http://www.york.ac.uk/services/cserv/training/iliad/welcome.htm* [1998, February 7].

Utah State Office of Education. (1996). *Library media/information literacy core curriculum for Utah secondary schools.* Salt Lake City, UT: Author.

Walster, D. (1995). Student-centered information literacy programs: The Colorado vision. In B.J. Morris, J.L. McQuiston, & C. L. Saretsky (Eds.), *School Library Media Annual* (pp. 45-53) Englewood, CA: Libraries Unlimited, Inc. (EJ 516 580)

Wileman, R. E. (1980). *Exercises in visual thinking.* New York: Hastings House.

Wolff, R. A. (1994). Rethinking library self studies and accreditation visits. In Edward D. Garten, Ed. *The challenge and practice of academic accreditation: A sourcebook for library administrators.* New York: Greenwood Press. pp.125-138.

Work Group on Information Competence. Commission on Learning Resources and Instructional Technology Task 6.1. (1995, December). *Information competence in the CSU: A report.* Susan C. Curzon, Chair.

Wisconsin Educational Media Association. (1993). *Information Literacy: A Position Paper on Information Problem-Solving.* Appleton, WI: Author.

Wulf, K. (1996). In Kerka, S. Distance learning, the Internet and the World Wide Web. ERIC Digest. (ED 395 214).

Annotated ERIC Bibliography

Journal Articles (Elementary-Secondary)

Aaron, S. L. (1995). Bridges, windows, and frameworks: A 21-century school library media education curriculum. *School Library Media Annual (SLMA) 13*, 24-30. (EJ 516 577)

Discusses future education for library media specialists that will reflect the changes being brought about as a result of school restructuring. Topics include an educational model based on instructional specialization, realigned staffing patterns, a global perspective, information literacy, and helping students construct effective mental frameworks for learning.

Adams, S. & Bailey, G. (1993). Education for the information age: Is it time to trade vehicles? *NASSP Bulletin, 77*(553), 57-63. (EJ 463 900)

Traditional instruction employs text/talk vehicle focused on basic literacy, with little effort to engage students in information literacy, or accessing, analyzing, synthesizing, applying, and creating information with electronic media. This article provides Information Age Teaching-Learning Audit to help principals assess their schools' progress in understanding and using emerging instructional technologies (computers, CD-ROMS, videodiscs, scanners, E-mail, and other audiovisual aids).

Barron, D. (1996). Families, technology, and literacy: Roles and research resources for school library media specialists (Part 1). *School Library Media Activities Monthly, 13*(4), 47-50. (EJ 534 523)

Families need to become involved with their children's development of information literacy skills. Statistics on television and home computer ownership and online access for families and schools are presented, and resources that school library media specialists can use to promote family involvement are described.

Barron, D. D. (1996). Recent dissertation research and the individual school library media specialist. *School Library Media Activities Monthly, 12*(9), 49-50.

Describes the role and responsibilities of the school library media specialist as identified in 1994-96 dissertation research. Highlights include media specialists as collaborative workers, the importance of leadership, commitment to a media literacy-skills program and student needs, professional development, the need for principal support, curriculum-integrated library instruction, and personal characteristics. (EJ 523 198)

Breivik, P. & Senn, J. A. (1993). Information literacy: Partnerships for power. *Emergency Librarian, 21*(1), 25-28. (EJ 469 235)

Describes the partnerships between teacher-librarians and principals, teachers, community members, public librarians, and businesses that school children need to gain information literacy skills. Descriptions, which are adapted from the forthcoming book "Information Literacy: Resources for Elementary School Leaders," include the rationale for partnership and concrete examples.

Brock, K. (1994). Developing information literacy through the information intermediary process: A model for teacher-librarians and others. *Emergency Librarian, 22*(1), 16-20. (EJ 491 450)

Reports on a study designed to formulate a literature-based model describing what teacher-librarians do as they help students involved in information search and use (ISU). Whether teacher-librarians work with students in all phases of the ISU process and the extent to which their intermediary activities can be related to other models are considered.

Callison, D. (1993). Expanding the evaluation role in the critical-thinking curriculum. *School Library Media Annual (SLMA)*, 11, 78-92. (EJ 476 208)

Discussion of the evolving role of the school library media specialist focuses on a model of the teaching role in the development of a critical thinking curriculum. Topics addressed include literacy redefined; restructuring media programs; collection development and information access; staffing changes; and intervention and evaluation strategies.

Callison, D. (1993). The potential for portfolio assessment. *School Library Media Annual (SLMA), 11*, 30-39. (EJ 476 204)

Describes the use of mapping and portfolio assessment by school library media specialists to document changes in student reading, writing, and information use patterns. Topics discussed include new curriculum designs in language arts and social studies; information literacy; comparing earlier and later work; and student reflection.

Callison, D. (1995). Restructuring pre-service education. *School Library Media Annual (SLMA), 13*, 100-12. (EJ 516 587)

Describes steps for improving preservice teacher education, including the training of school library media specialists. Highlights include behavioral aspects, including imitation, isolation, transfer, and technique; technological aspects; and the evolution of library and information literacy skills of the school media specialist.

Davis, L. et al. (1996). The state of the nation: Teacher-librarianship across Canada. *School Libraries in Canada, 16*(3), 21-24, 26-28. (EJ 536 250)

Compiles reports from school librarians throughout Canada on library activities and the issues affecting them. For each province, the initiatives of its individual school library and media specialists association are highlighted. Discusses various conferences, advocacy, professional development, education, training, information literacy, library funding, and school cutbacks.

Dishnow, R.E. (1994). Updating a library and information skills guide. *School Library Media Activities Monthly; 10*(6), 27-28,47. (EJ 477 976)

Describes the revision of the 1987 edition of "The Wisconsin Library Media Skills Guide" to emphasize information skills rather than library skills. Topics discussed include cooperation between library/media specialists
and classroom teachers, including curriculum development and flexible scheduling; new technology; literature use; and suggested activities and resources.

Doyle, C. S. (1995). Telementoring takes off in California: The telemation project develops integrated curriculum. *Internet Research, 5*(1), 40-45. (EJ 505 457)

Describes the Telemation project, a California grant-funded training project for teachers that used training institutes and telementors to develop information literacy. Highlights include collaboration; peer coaching; curriculum development; examples; and the TeleLearning Mobile Unit, a mobile learning center with computer workstations.

Eisenberg, M. & Spitzer, K. (1991). Skills and strategies for helping students become more effective information users. *Catholic Library World, 63*(2), 115-20. (EJ 465 828)

Addresses the implications for education of the expansion of information technology and proposes a model for teaching information skills within the context of an overall process. A model called the "Big6™ Skills" is presented, and its application to information problems related to school, life, and work are explained.

Harada, V. H. & Nakamura, M. (1994). Information searching across the curriculum: Literacy skills for the 90s and beyond. *Catholic Library World, 65*(2), 17-19. (EJ 538 020)

In 1991, a partnership of three public schools in Hawaii received an Elementary and Secondary Education Act grant to develop a K-12 information skills curriculum and purchase electronic resources. Discusses installing the hardware and software, creating the information search framework, and developing the K-12 guide. Evaluates the two year project and outlines the information search steps.

Harris, J. (1996). Telehunting, telegathering, teleharvesting: Information-seeking and information-synthesis on the Internet. *Learning and Leading with Technology, 23*(4), 36-39. (EJ 518 455)

Presents five plans to assist students in information seeking on the Internet and provides examples of activities. Highlights include practicing search skills, learning about a topic of inquiry and/or question answering, reviewing multiple perspectives on an issue, solving authentic problems, and publishing synthesized and/or critiqued information overviews for other students to use.

If we had information standards, what would they be? Information and library media skills documents. (1994). *School Library Media Activities Monthly, 10*(5), 49-50. (EJ 476 338)

Discussion of the development of educational standards and the impact on school library media programs focuses on what constitutes information skills, or information literacy. Documents for 27 states are listed that outline the information skills actually taught in the various states.

Johnson, D. & Eisenberg, M. (1996). Computer literacy and information literacy: A natural combination. *Emergency Librarian, 23*(5), 12-16 (EJ 526 333)

Teacher-librarians must prepare students to use technology and information effectively. An outline for a curriculum entitled "Computer Skills for Information Problem-Solving" is presented. Specific desired competencies are listed in the following areas: (1) task definition; (2) information-seeking strategies; (3) location and access; (4) use of information; (5) synthesis; and (6) evaluation.

Kuhlthau, C. (1993). Implementing a process approach to information skills: A study identifying indicators of success in library media programs. *School Library Media Quarterly, 22*(1), 11-18. (EJ 473 063)

Describes a study that evaluated implementing a constructivist process approach to learning information skills in school library media programs. Training institutes for media specialists, a longitudinal case study, and the identification of inhibitors and enablers of successful programs are discussed.

Kuhlthau, C. (1995). The process of learning from information. *School Libraries Worldwide, 1*(1), 1-12. (EJ 503 404)

Presents the process of learning from information as the key concept for the library media center in the information age school. The Information Search Process Approach is described as a model for developing information skills fundamental to information literacy, and process learning is discussed.

Limberg, L. (1993). Swedish school libraries for education 2000: Fears, hopes, and expectations in Swedish school librarianship. *School Library Media Annual (SLMA), 11*, 59-64. (EJ 476 206)

Presents an overview of libraries in Swedish schools. Topics addressed include restructuring Swedish education motivated by new principles for governing schools, economic recession, and a government proposal for a new national curriculum; cooperation with public libraries; district coordination; school libraries as change agents; information skills programs; and future plans.

Loertscher, D.V. (1994). Treasure mountain IV. The power of reading: The effect of libraries and reading promotion on reading competence. *School Library Media Annual, 12*, 198-99. (EJ 495 193)

Describes two Treasure Mountain IV conferences. The first conference brought practitioners together with researchers Stephen Krashen and Keith Lance to discuss evidence that school library media programs make a difference in academic achievement. The second conference focused on the possibility of measuring the impact of library media programs on resource-based teaching and information literacy.

Mancall, J. (1993). The changing library landscape: Impact on student instruction and use. *School Library Media Annual (SLMA), 11*, 66-76. (EJ 476 207)

Discusses changes in school libraries and their impact on student instruction and use. Highlights include national guidelines; the National Goals for Education; educational research and reporting; global patterns; information delivery and storage; the projected configuration for libraries and information services; skills for information literacy; and instructional considerations for achieving skill development.

McFadden, A.C., et al. (1993). Trends and issues in the 1992 professional education literature. *School Library Media Annual (SLMA), 11*, 178-85. (EJ 476 219)

Identifies the main topics addressed in the professional education literature during 1992, including cooperative learning, multicultural education, portfolio assessment, constructivism, adolescence, occupational education, educational management, counseling and personnel services, reading and communication skills, handicapped students, language instruction, information resources, computers, and teacher education.

Montgomery, P. (1993). Information skills at the national level: A report on the activities of the information skills task force of the American Association of School Librarians. *School Library Media Annual (SLMA), 11*, 186-88. (EJ 476 220)

Reports on activities of the Information Skills Task Force of the American Association of School Librarians that addressed three main issues: (1) student competencies required to access, use, and apply information; (2) preparing an information skills curriculum; and (3) ensuring the integration of information skills into the elementary and secondary school curriculum.

Niinikangas, L. (1995). An open learning environment—New challenges for the Finnish School Library. *Scandinavian Public Library Quarterly, 4*, 1-11

Discussion of the role of Finnish school libraries in supporting learning focuses on the development work and further education provided by the Further Education Centre for Vocational Institutes and Administration in Finland. Highlights include school libraries in comprehensive schools and vocational institutes, resource-based learning, and information skills and information literacy. (EJ 513 824)

Ohlrich, K. B. (1996) What are we? Library media information specialists, computer technology coordinators, teacher instructional consultants, school-based management team members, or what? *School Library Media Activities Monthly, 12*(9), 26-28, 32 (EJ 523 194)

Discusses four areas in school library media programs that media specialists are expected to develop. Topics include promoting information literacy among students; knowing how to evaluate and use various information technologies; consulting with teachers to strengthen student learning and outcomes; and serving on school-based management committees.

Pappas, M. (1993). A vision of school library media centers in an electronic information age. *School Library Media Activities Monthly, 10*(1), 32-34,38 (EJ 469 122)

Discusses trends evolving in schools and library media centers as a result of electronic information technologies, including the shift from acquisition to access, the storage of information, the growth of image-based technologies, technology and management, information skills needed for electronic resources, information networks, impact on curriculum, and "hyperlearning."

Pappas, M. L. (1995). Information skills for electronic resources. *School Library Media Activities Monthly, 11*(8), 39-40. (EJ 499 875)

Discusses the importance of developing strong skills in electronic searching and stresses the importance of teaching these skills across the curriculum. Several skill models, are suggested and components of search strategies are briefly outlined.

Rader, H. B. (1994). Library orientation and instruction—1992. *RSR: Reference Services Review, 22*(2), 79-95. (EJ 486 753).

This annotated list of materials dealing with information literacy includes publications on user instruction in academic libraries (140 titles), public libraries (4 titles), school libraries (56 titles), and special libraries (11 titles) and for all levels of users (6 titles). Statistics regarding the numbers of publications are discussed.

Simpson, C. et al. (1996). Full speed ahead on the Internet. *Book Report, 15*(2), 3,5-7, 9-11,13-14. (EJ 529 710)

This supplement assembles six articles covering Internet usage in the library media center, including: selecting and evaluating Internet resources; developing information literacy skills to reach educational goals; and citing Internet resources. It examines demographic profiles of schools that are connected to the Internet and provides
tips and guidelines for teachers on using and teaching Internet skills.

Walster, D. & Welborn, L. (1996). Writing and implementing "Colorado's information literacy guidelines": The process examined. *School Library Media Activities Monthly, 42*(6), 25-28, 36. (EJ 516 616)

Describes how "Colorado's Information Literacy Guidelines" were written and implemented and provides suggestions for developing similar guidelines. Discusses drafting parameters, revisions and community participation, final editing and distribution, and three projects that are contributing to successful implementation.

Elementary-Secondary ERIC Documents

ACCESS PENNSYLVANIA curriculum guide. (1991). 54 p. (ED 355 963)

This curriculum guide was prepared as a tool for teaching students the purpose and function of the ACCESS PENNSYLVANIA database in the total concept of information literacy. The database on compact laser disc contains information about the holdings of hundreds of school, public, academic, and special use libraries. The database can be searched at the local level using a microcomputer and two laser disc readers, by title, author, subject, location, type of material, publication date, key word, or a combination of these reference points. Students must learn to analyze their information needs and to evaluate the information source itself. The guide encourages integration of database use into the total curriculum. There are 16 lesson plans, each with the lesson objective, the expected level of student achievement, activities that must be performed by the media specialist and the student, resources needed to teach the lesson, and an evaluation process. The lessons include knowledge of computer hardware and software, as well as how to use the system. Six handouts and a 46-item glossary are included.

Australian Library and Information Association. (1994). *Learning for the future: Developing information services in Australian schools.* Australian School Library Assoc., Goulburn. Carlton, Australia: Curriculum Corp.(ED 377 826). Document Not Available from EDRS.

This guide is intended to set a context for the development of library and information services in Australian schools. The focus reflects recent changes in Australian education, in particular the development of national curriculum statements. These changes emphasize the processes of learning and the consequent need for information and information literacy, as well as the shift to collaborative school development planning, decision-making and management. To achieve the desired changes, it is important to develop information-literate teachers and students, and to use collaborative strategies among teachers, library staff, and administrators to integrate the processes of learning, especially resource-based learning, across the curriculum. Resource-based learning is a methodology that allows students to learn from their own confrontation with information resources. Factors that should be considered in developing the school and library resource center as a positive information environment are outlined, and benchmarks against which schools can evaluate current provisions for developing information literacy are presented.

Barron, A. & Ivers, K. (1996). An internet research model. In: *Call of the North, NECC '96. Proceedings of the Annual National Educational Computing Conference* (17th, Minneapolis, Minnesota, June 11-13, 1996. 6 p. (ED 398 880).

Meaningful Internet activities should take advantage of the distance, multiple resources, and speed that telecommunications can offer. They should also require K-12 students to synthesize, analyze, and evaluate the information, rather than simply collecting facts. This paper focuses on basic, advanced, and original research activities of the Internet. Basic research refers to retrieving information from a single, often preselected, online source; advanced research includes a wider variety of sources and involves high-order thinking skills; and original research focuses on using the Internet to conduct investigations through surveys and collaborative experiments. Alternatives to online research are examined and a six-step procedural model is proposed for conducting relevant and meaningful Internet activities. The online research model consists of: (1) questioning; (2) planning; (3) gathering (online); (4) sorting & sifting; (5) synthesizing; and (6) evaluating.

Breivik, P. S. & Senn, J. A. (1994). *Information literacy: Educating children for the 21st century.* 198 p. New York: Scholastic Inc. (ED 373 801). Document Not Available from EDRS. (Note: 2nd edition published [1998], ED number pending)

This book is about resource-based learning, a means by which educators can teach their students to be lifelong learners. The eight chapters contain information to help students learn how to find, process, and evaluate the information they need to handle the task at hand: (1) "Surviving in an Information Age" examines the information explosion and its affects on education; (2) "A Commonsense Approach" identifies methods of instructing information literacy; (3) "Specific Concerns" discusses specific problems that educators will encounter when changing the curriculum; (4) "Overcoming Barriers" pinpoints barriers to the new curriculum and discusses methods of overcoming them; (5) "Your Investment" considers how to reallocate resources to pay for resource-based learning without additional funds; (6) "Connecting with Community Resources" covers how to form partnerships in the community in order to ensure the successful implementation of the new curriculum; (7) "Assessment of Resource-Based Learning" considers evaluation procedures; and (8) "Moving Forward" gives examples and hints for actually implementing the new curriculum. A reading list is also included.

Burnheim, R. K. (1993). *The questions that they ask.* 19 p. (ED 368 379)

This paper discusses the competencies that are required to work effectively with information. It examines the nature of the information resources and how students interact with them. The discussion moves to the types of questions students have asked and suggests that the predominant types may not be assisting students in developing information usage skills, thus not improving their mastery of a skill set such as that proposed by R. J. Marzano and R. W. Ewy (1989). Reviews of research have indicated that teachers often do not ask questions that require students to work with information resources, relying instead on questions that merely ask for the recall of knowledge. The challenge is for teachers to more frequently pose questions that encourage students to use the problem-solving approaches they will need in the world of the future. The rapid redundancy of information means that no institution can give its students all the knowledge they will need, but students can be given the skills to update and refine their knowledge. Two figures illustrate the discussion.

Colorado Educational Media Association. (1994). *Model information literacy guidelines.* Colorado State Dept. of Education, Denver: State Library and Adult Education Office. 10 p. (ED 373 797)

This document contains information literacy standards developed for the State of Colorado. The purpose of the standards is to provide all students with a process for learning that is transferable among subjects and from the academic environment to real life. Its goal is to have all students using information and ideas effectively. The five standards are: (1) the student constructs meaning from environment; (2) the student

creates a quality project; (3) the student learns independently; (4) the student participates effectively as a group member; and (5) the student uses information and information technologies responsibly and ethically. The rationale behind the need for information literacy standards and the standards themselves is presented. Finally, the components of each standard are outlined. A list of Information Literacy Standards Writing Project Team members is also included.

Dame, M. A. (1993). *Serving linguistically and culturally diverse students: Strategies for the school library media specialist.* 175 p. New York: Neal-Schuman Publishers, Inc. (ED 375 650). Document Not Available from EDRS.

This book provides a framework for expanding the school library's function to meet the needs of the linguistically and culturally diverse students, outlining specific strategies that librarians can use to advocate information literacy and information access equality. Six chapters focus on: (1) the emerging role of the proactive librarian and the establishment of the library as a key center for information access; (2) promoting a love of reading among students through storytelling, shared composition, and other literacy activities; (3) library literacy activities that teach and reinforce language; (4) adapting collection development and cataloging systems to meet the needs of linguistically diverse students; (5) collecting multicultural and foreign-language materials; and (6) collecting and using picture files. A directory of resources provides sources and listings of materials relevant to teacher education; library training; grant writing, foreign language publishers, distributors, and bibliographies; acquisition; picture books; nonprint and multimedia resources; reference works; and organizations.

Doyle, C. S. (1994). *Information literacy in an information society: A concept for the information age.* ERIC Clearinghouse on Information and Technology, Syracuse, NY. 82 p. (ED 372 763)

Information literacy is the ability to access, evaluate, and use information from a variety of sources. This document traces the history of the development of the term "information literacy" and discusses the emergence of information literacy as an important concept in contemporary society. Two major events are examined that have driven information literacy into the forefront of educational reform: the Secretary's Commission on Achieving Necessary Skills (SCANS) Report and the National Educational Goals. The impact of technology on the concept of information literacy is discussed. Finally, recent revisions in national curriculum standards that imply recognition of information literacy skills are examined, including mathematics, social studies, and science standards. An annotated bibliography is included.

Dreher, M. J. (1995). *Sixth-grade researchers: Posing questions, finding information, and writing a report.* Reading Research Report No. 40. Summer 1995. 17 p. (ED 384 014)

In two sections of a world history class, 43 sixth graders, all considered competent readers, participated in two sets of tasks. First, they used a familiar textbook to locate the answers to six questions, all of which contained terms that could be found in the book's index. Second, they participated in a report-writing project in which they were asked to generate research questions, locate information to answer those questions using multiple sources, take notes, and write a research report conforming to their teacher's expectations. Despite being competent readers, who had instruction relevant to finding information and who had completed several reports during the year, these students exhibited a wide range of performance and many difficulties. The results are discussed in relation to their implications for helping children develop independent, flexible strategies for finding and using information.

Eisenberg, M. B. & Johnson, D. (1996). *Computer skills for information problem-solving: Learning and teaching technology in context.* ERIC Digest. 6 p. (ED 392 463)

Over the past 20 years, library media professionals have worked to move from teaching isolated library skills to teaching integrated information skills. Effective integration of information skills has two requirements: (1) the skills must directly relate to the content area curriculum and to classroom assignments; and (2) the skills themselves need to be tied together in a logical and systematic information process model. Schools seeking to move from isolated computer skills instruction also need to focus on these requirements. Library media specialists, computer teachers, and classroom teachers need to work together to develop units and lessons that will include both computer skills, general information skills, and content-area curriculum outcomes. The "Big6™ Skills Approach to Information Problem Solving" is an information literacy curriculum, an information problem-solving process, and a set of skills which provide a strategy for effectively and efficiently meeting information needs. This model is transferable to school, personal, and work applications, as well as all content areas and the full range of grade levels. The Big Six Skills include: (1) task definition; (2) information seeking strategies; (3) location and access; (4) use of information; (5) synthesis; and (6) evaluation. An addendum is included which presents skills and knowledge related to technology that are not part of the computer and information technology curriculum.

Eshpeter, B.; Gray, J. (1989). *Preparing students for information literacy. School library programs and the cooperative planning process.* Calgary Board of Education, Alberta. 120 p. (ED 357 766)

This report discusses the development of a school library program for Canadian schools that departs from tradition by focusing on the instructional role as the most significant work of the teacher-librarian and presents a new program model paradigm. The paradigm is examined under three main headings: (1) the instructional component; (2) student information profiles; and (3) cooperative planning. The focus of the instructional component of the model is its information segment in which five phases are explored: the pre-search phase; information retrieval; information processing; information organizing and creating; and information sharing. The report then discusses what student information profiles are, the importance of having profiles in strengthening library value by building student skills and problem-solving behaviors, and how these profiles are developed for each phase of the information/instructional component. Finally discussed is the cooperative planning and teaching function in which there is integration of information strategies and skills into the curricular programs of the classroom. Reproducible presentation masters on school library programs and the model paradigm are provided.

From library skills to information literacy: A handbook for the 21st century. (1994). Englewood, CO: Libraries Unlimited. (ED 369 415) Document Not Available from EDRS.

This handbook is designed to help classroom teachers, library media specialists, and others who wish to integrate information literacy into their curriculum. It provides models and strategies which encourage children and young adults to find, analyze, create, and use information as they become productive citizens. The following topics are addressed: information literacy defined; stages of the research process; instructional planning for information literacy; instructional strategies for developing information literacy; sample scenarios of integrated units; and integrating information literacy into local or state frameworks. Included in the appendices are a report on integrating information literacy into national agendas and a planning guide for research process competencies.

Giguere, M., And Others. (1995). Enhancing information literacy skills across the curriculum. In: *Literacy: Traditional, Cultural, Technological. Selected Papers from the Annual Conference of the International Association of School Librarianship* (23rd, Pittsburgh, Pennsylvania, July 17-22, 1994); see IR 056 058. 5p. (ED 399 951)

Information literacy is an set of acquired skills and strategies which encompass the abilities to recognize a need for information, to retrieve the required information, and to evaluate and utilize it effectively. Teaching students how to structure, acquire, analyze, and synthesize information must start much earlier than at the post-secondary level. The paper provides a brief review of the history and development of the information literacy project, and describes the resource-based approach that the model utilizes. The information literacy model strives to be an effective tool designed to help students and teacher-librarians in elaborating their research paths. A fundamental assumption upon which the model is based is that the presentation of a rich variety of information resources as well as suggested paths to retrieve these resources will improve the quality of search strategies used and, as a consequence, the research produced. The model is comprised of two major components: an inventory and analysis of identified categories of resources, and the individual research paths designed for each category which outline the process which one might follow in order to rapidly and efficiently utilize a resource. The process fosters independent, cooperative, and resource-based learning. (Author/SWC)

Hancock, V. E. (1993). *Information literacy for lifelong learning.* ERIC Digest. Syracuse, NY: ERIC Clearinghouse on Information & Technology. 4 p. (ED 358 870)

Information literacy requires that the learner recognize the need for information, be able to identify and locate it, gain access to it, and then evaluate the quality of the information received before organizing it and using it effectively. In an information literate environment students engage in active and self-directed activities. Information literacy thrives in a resource-based learning environment in which students and teachers make decisions about appropriate sources of information and how to access them. Information literacy benefits students by counteracting the information dependency created by traditional schooling and sets the teacher free to become the facilitator of interaction at the small-group or individual level. Information literate students are more effective consumers of information resources, and become better-prepared citizens, who know how to use information to their best advantage in work and everyday life. The workplace of the future will also demand information literate workers. An early commitment to learning as a process will enable the worker of the future to function effectively.

Information literacy in an information society. ERIC Digest. (1994). Syracuse, NY: ERIC Clearinghouse on Information and Technology. 4 p. (ED 372 756)

Information literacy is the ability to access, evaluate, and use information from a variety of sources. This digest defines the information literate person and describes the evolution of the concept. Information literacy is examined in the context of existing practice; and the impact of technology on the storage and dissemination of data, resulting in the need for information literacy in telecommunications, is considered. Finally, information literacy is discussed in relationship to educational reform and to curriculum standards in mathematics, social studies, and science.

Keenan, N. And Others. (1994). The Montana library and information skills model curriculum guide. Montana State Office of Public Instruction, Helena. Dept. of Vocational Education Services. 106 p. (ED 382 216)

This document presents a model curriculum for library media skills programs. The first and second sections provide a library and information skills mission statement and an introduction. The collaborative planning process is covered in the third section, including a description of collaborative planning, assessing the process and a collaborative unit, and sample collaborative planning guides. In the fourth section, the problem-solving process is defined and six main skills are highlighted; examples and an assessment of the process and a guide to research planning are also provided. The fifth section defines literacy, and discusses components and assessment of a literacy program. The sixth section contains position statements on the following: technology, flexible scheduling, appropriate staffing for school library media centers, and the role of the school library media program. Appendices provide a list of information and library media skills, 10

ways to analyze children's books for racism and sexism, examples for content area reading, assessment models, and model lessons.

Kirk, J. (1987). *Information skills: An educational perspective for tomorrow.* Paper presented at the Biennial Meeting of the Australian School Library Association (10th, September 3-7, 1987). 19 p. (ED 359 981)

Features of the information society are discussed, and implications for education are reviewed. The information society is dominated and even overwhelmed by information. Its future is uncertain, but regardless of the eventual potential for good or harm, information literacy is a precondition of the information society. Young people in Australia are becoming more computer literate, and education authorities are developing new educational agendas for the information society. Resource-based learning is an approach that is particularly appropriate in fostering the development of individual students. The shift in emphasis from the content of what students learn to the processes of learning depends on the use of information and the development of information skills that define the purpose of an information task, locate data, select and interpret data, and use the information to complete the task. A look at information skills as they are taught in other countries highlights developments, with implications for teachers, teacher-librarians, and principals. Effective information skills programs depend on a wide range of resources. Information technology in all its forms must be an integral part of the school curriculum.

Lamb, L. & Todd, R. (1994). *The challenge of information literacy: A Catholic secondary school's response.* Paper presented at the Convention and Exposition of the National Catholic Educational Association on Unity in Diversity: Embracing the Challenge (91st, Anaheim, CA, April 4-7, 1994). 19 p. (ED 374 807)

This paper focuses on a program at Marist Sisters' College, Woolwich (MSCW), an Australian secondary school, that integrates information skills into subject curriculums. A description of the school which includes its philosophy and ethnic makeup is presented to give a context for the program. The research project investigated the impact of information skills on learning and teaching. An interdisciplinary planning team was established to help teachers develop information skills in the classroom. The team found that there were four levels of commitment in regard to the program: resistance, curiosity, acceptance, and commitment. The team implemented two strategies to help teachers progress through the stages: a demonstration program was set up so that teachers could observe the process; and teachers were involved in negotiating lesson planning. Both qualitative and quantitative data were gathered to evaluate the program. Both teachers and students found the addition of information skills to the curriculum to be beneficial. These skills had an impact on students' self perception, learning processes, learning outcomes, and on the learning environments. The paper concludes by discussing the role of school administrators in integrating information skills into the curriculum.

Manitoba Dept. of Education. (1994). *Resource-based learning: An educational model.* 67 p. (ED 372 736)

This document was prepared as a guide for educators in Manitoba (Canada) to facilitate the implementation of the resource-based learning model implicit in the province's curriculum guides from kindergarten through Senior 4 and to integrate the instructional programs of the classroom and the school library as specified by the provincial department of education. The guide will facilitate the implementation of the educational reform set out in recent department publications. Resource-based learning is an educational model that actively involves students, teachers, and teacher-librarians in the meaningful use of appropriate print, nonprint, and human resources. The model requires the services of a qualified teacher-librarian to assist teachers in integrating the use of school-library learning resources into their classroom programs in order for the model to be successful. This guide includes a description of the model and an outline of its implementation. (Contains 32 references, a set of learning goals, a glossary, suggestions for student presentations and learning units, 155 resources for classroom teachers, and a 23-item supplementary reading list.)

McKenna, M. (1994). *Libraries and the internet.* ERIC Digest. 4 p. (ED 377 880)

The Internet is an international computer network encompassing thousands of smaller interconnected networks. This digest describes various uses of the Internet and its impact on libraries, as well as Internet-related library issues. The Internet applications of electronic mail (E-mail), telnet, and file transfer protocol (FTP) are briefly described. The impact of the Internet on libraries includes: leadership opportunities; cost and time savings; question answering services; international interlibrary loans; document delivery services; online transactions; government information; information sharing; and increased librarian visibility and value to the community. Internet-related issues are discussed with respect to academic, public, special, and school libraries. It is recommended that librarians take an active role in the formulation of national policy and legislation, creation and organization of services and resources, and be properly trained in network literacy in order to provide programs for patrons to become network literate.

McNicholas, C. & Nelson, P. (1994). *The virtual school library: Moving toward reality.* Paper presented at the Annual Convention of the National Catholic Educational Association (91st, Anaheim, CA, April 4-7, 1994). 19 p. (ED 375 837)

The response of Marist Sisters' College, Woolwich, New South Wales (Australia), to the challenges of teaching information literacy is described. Marist Sisters' College is a high school enrolling approximately 750 girls representing diverse cultures and socioeconomic backgrounds in grades 7 through 12. An integrated information-skills program, described elsewhere, has been developed across the curriculum, and networked computer terminals and CD-ROM towers have become the foundation for an information-technology program aimed at information literacy. The concept of the virtual library serves the College's aspirations for the information environment. The virtual library as it is being developed at Marist Sisters' College gives access to more information than is contained in four walls through electronic access to internal resources and external services, including catalogs and local area networks that enable remote access. Part of the virtual library approach is focusing on the skills needed to use technology as a tool. The virtual library is providing a dynamic and diverse information environment that supports the entire school curriculum. A detailed outline of the information process--defining, locating, selecting, organizing, presenting, and assessing--in terms of skills and outcomes is presented in tabular format. (Contains 12 references.)

Mendrinos, R. (1994). *Building information literacy using high technology: A guide for schools and libraries.* 190 p. Englewood, CA: Libraries Unlimited, Inc. (ED 375 820). Document Not Available from EDRS.

This guide to using the tools of online databases, telecommunications, and CD-ROM technology in the educational environment provides a practical introduction to the concepts and importance of information literacy and high technology resource-based learning. It also describes the drawbacks and advantages of these tools from an educator's viewpoint. The book provides procedures for going online and gives guidelines for using CD-ROM technology and networking. Chapter 1 focuses on developing information literacy within a resource-based learning environment using high-tech tools and their affinity with instructional theory and student achievement. Chapter 2 provides a background for online databases, utilities, and telecommunications networks. It covers getting started, advantages and disadvantages of online searching, database vendors, electronic mail, concerns in using telecommunications in the classroom, and the Internet. Chapters 3 and 4 examine CD-ROMs and education, including planning, local area networks, and CD-ROM networks. Case studies of schools using information technology are presented in Chapter 5, and Chapter 6 outlines a model for a research strategy using online technology. Finally, Chapter 7 contains sample lesson plans to serve as models to integrate curricula and high-tech tools to stimulate student motivation and achievement. A glossary and an index are included.

National Commission on Libraries and Information Science. (1993). *Open forum on children and youth services: Redefining the federal role for libraries* (Boston, Massachusetts, May 4-5, 1993). 231 p. (ED 368 371)

The U.S. National Commission on Libraries and Information Science (NCLIS) conducted an open forum May 4-5, 1993 on the changing role of the federal government in support of library and information services and literacy programs for children and youth. The following topics were addressed: current status of library and information services for elementary and secondary school students; role of school library media centers in achieving the six National Education Goals; future federal roles in support of library media programs and services for children and youth from public libraries; nature of federal support for school library media programs and public library services for students; nature of federal support of technology for school and public library programs for children and youth; role of public and school libraries in promoting resource-based learning, information skills, and instructional activities; how school and public library partnerships should be developed; how libraries can develop intergenerational demonstration programs for latchkey children and young adults and outreach programs for youth at risk; and the community library's role in offering parent/family educational programs for early childhood services. Includes 4 appendices.

New Hampshire State Dept. of Education. (1992). *Information skills: A report from the ad hoc committee.* 25 p. (ED 368 358)

In 1990 a committee was formed to develop a list of information skills that could be used by New Hampshire library media professionals to help them develop plans for integrating such skills within their schools. Information skills are processes needed to access, evaluate, organize, communicate, and apply information efficiently and effectively. The following core objectives, which are considered important for all grade levels even though implementation differs according to grade, were developed: (1) understanding the function of information in contemporary society; (2) using libraries and information systems as sources of information and recreation; (3) demonstrating responsible and ethical use of information technologies; (4) recognizing strengths, weaknesses, and impacts of information sources; (5) clarifying information needs and developing search strategies; (6) using a variety of skills and strategies to record and organize information; (7) constructing meaning from information; (8) using a variety of methods and formats to communicate information; and (9) evaluating the effectiveness of search strategies and information use. Four appendixes provide examples of determining levels of emphasis, information skill plans, a sample unit, and a sample planning form.

North Dakota State Dept. of Public Instruction. (1993). *North Dakota curriculum frameworks, Volume I: Language arts, library media, mathematics, science, social studies.* 101 p. (ED 370 175)

Curriculum frameworks for North Dakota elementary-secondary education are presented in this document. These frameworks are voluntary and serve to promote interdisciplinary learning, active learning, and student diversity. They are part of a larger systemic approach to improve instruction in the state's schools and to identify content outcomes and student-performance standards. Each section contains: a list of North Dakota educators involved in the framework development; a mission statement for that particular subject area; the graduation outcomes for the state; a list of content outcomes; content outcomes and performance standards for each outcome at grades 4, 8, and graduation; a glossary of terms; and a bibliography. Curriculum frameworks are provided for the following areas: language arts; library media (access to information, information literacy, promotion of lifelong learning); mathematics; science; and social studies.

Olen, S. (1995). A transformation in teacher education: Or how can disadvantaged teachers become information literate? In: *Literacy: Traditional, Cultural, Technological.* Selected Papers from the Annual Conference of the International Association of School Librarianship (23rd, Pittsburgh, Pennsylvania, July 17-22, 1994); see IR 056 058. 7 p. (ED 399 948)

In a developing country such as South Africa, many teachers enter initial teacher education with little or no experience of libraries and information sources. These students need to become information literate during their initial teacher education, otherwise they will not have the knowledge of information sources and skills which they will need if they are going to be role models for their pupils and help them to become information literate. The paper describes a project to improve the media and information skills of under-qualified teachers through in-service workshops. The process could also be used as a model for initial teacher education with students from disadvantaged or more privileged backgrounds. It is important for pupils to become information literate, but before this can happen, their teachers must themselves become information literate. Teaching style influences student learning, and must follow a clearly formulated process, like the one described. This is one way to help transform the prevailing teacher-centered and textbook-centered teaching style to an interactive teaching and learning process based on available information sources.

Orr, M. & Fankhauser R. (1996). Approaches to research in a digital environment—Who are the new researchers? In: *Learning Technologies: Prospects and Pathways.* Selected papers from EdTech '96 Biennial Conference of the Australian Society for Educational Technology (Melbourne, Australia, July 7-10, 1996). 8 p. (ED 396 739)

The research process has been a constant feature of the curriculum in primary and secondary schools for many years. The purpose of this process has traditionally been to develop student research skills and to enhance their knowledge within a particular area. The Information Process diagram, developed by the Australian School Library Association in conjunction with the Curriculum Corporation, places the research process within the context of generic learning skills. The advent of the digital information era has challenged and changed many of the traditional research sources, tools, practices and the premises on which they operate, though the essential process still depends on critical thinking, problem solving, and communicating. The digital information environment is dynamic; multimedia sources combine several media such as text, graphics, animation, audio, and video in an integrated format which is accessed by computer. Related technologies are having an impact on Australian education, for example. Digital cameras, notebook computers, and other devices have aided secondary students in recording observations during an expedition to the Snowy River. Primary students have also used educational technology to enhance information gathering at a trip to a botanic garden. Students can create personalized "knowledge webs," with their assignments hyperlinked to each other and to Internet resources. Each new resource format requires the development of new skills or extensions of old ones to enhance student learning. Students must become competent researchers and information managers with a well-developed capacity to critically evaluate information for accuracy, relevance, and usefulness as well as to search and manage huge quantities of information available through the Internet and other electronic sources. Information literacy within a digital environment uses many of the information skills already identified in the literature, but new skills must be taught if the potential of a digital world is to be exploited. The digital environment has allowed students and teachers to become part of a global research community that is premised on information sharing and individual and collective discovery.

Semali, L.M. (1995). Teaching media: English teachers as media and technology critics. In *Eyes on the Future: Converging Images, Ideas, and Instruction.* Selected readings from the Annual Conference of the International Visual Literacy Association (27th, Chicago, IL, October 18-22, 1995). 10 p. (ED 391 500)

This paper discusses the role of media in presenting information to society and emphasizes the need for English teachers to incorporate critical media awareness into education. Four postulations are identified that are at the core of teaching media as a form of textual construction: (1) all media are a construction, which represents conscious and unconscious decisions about what knowledge is valid and valued; (2) audiences negotiate meaning; (3) the curriculum represents ideology and values and has social and political implications; and (4) the nature of media messages can affect social attitudes and behavior. A group of 20 teachers attending a media literacy workshop at Pennsylvania State University in the summer of 1994 were asked to rate the frequency with which they undertook certain core critical media literacy activities; results revealed that teachers were not aware of what they could do about media in their language arts classrooms and that nonprint media are still an isolated phenomena in schools. The workshop encouraged teachers to work towards integrating forms of media literacy into their teaching and covered analysis of codes and conventions, personal experience, cultural and ideological meanings, and commercial overtones and economic strategies. A table depicts the teachers' ratings on media practice in the classroom.

Simpson, C. (1996). *The school librarian's role in the electronic age.* ERIC Digest. 4 p. (ED 402 928)

The dawn of the electronic age has altered the role of the school librarian: the position is less of a warehouse manager and more of a reference consultant, the emphasis is access to information rather than collection development, and the librarian is an information center manager, specialist, and teacher of information technology. School restructuring, more student-centered teaching methods, and the change from a passive learning environment into an active one require collaboration between librarians and classroom teachers to meet the information needs of students. Librarians must become proficient in the use of the new technologies to promote them and instruct students and teachers in their use. As access to information overtakes ownership of information, librarians seek out and evaluate online and other electronic sources to meet the information needs of patrons. Librarians must teach students and teachers to be discriminating users of information, teach ethical use of the materials received, and form access policies and acceptable use agreements. The expanding functions of the library necessitate that the librarian become an information center manager, developing skills to manage the different groups of people who will work in the library. The librarian is the campus expert in information location and management and thus in the best position to be on the forefront of information technology and to train others in its use. The school librarian in the electronic age expands the services available from the library to include computer-based data and sophisticated information-seeking strategies. Working in concert with classroom teachers and curriculum experts, librarians form a comprehensive team designed to enhance student academic achievement and critical thinking skills necessary for success in lifelong endeavors.

Texas Education Agency. (1993). *The library media center: A force for student excellence.* 96 p. (ED 366 345)

The mission of today's school library media center is to help prepare students to enter the information age of the 21st century. To carry out this mission, library media specialists, administrators, and teachers must ensure that students can effectively locate, access, interpret, evaluate, and communicate information. The school library media center can offer assistance if it is adequately staffed and funded to develop a program that reaches all students in meaningful ways. This publication is intended to help districts develop library media programs that meet the needs of students and teachers. The following areas are addressed: (1) the library media center program; (2) library media center staff; (3) resources; (4) facilities; (5) financial support; (6) the library media center and the curriculum; and (7) the library media center and technology. Included in the appendices are state requirements for school library media centers; automation standards for school library media centers; position statements of the American Association of School Librarians; documents relating to material selection, censorship, and copyright issues; a planning guide; and a library media center appraisal checklist.

Todd, R., And Others. (1991). *Evolution, not revolution: Working to full school participation with information skills.* Paper presented at the Biennial Meeting of the Australian School Library Association (Levra, New South Wales, Australia, September 29-October 3, 1991). 19p. (ED 354 909)

An action research project underway at Marist Sisters' College (a secondary school) in Woolwich (New South Wales, Australia) is the first phase in the evolution of an across-the-school commitment to Cooperative Program Planning and Teaching (CPPT). Project goals include establishing an infrastructure to develop a dynamic methodology for CPPT in the school; facilitating the achievement of the individual teacher's goals for CPPT; and widening the CPPT base in the school to establish a school-wide commitment to information skills. To establish an infrastructure, a school-based interdisciplinary management team was formed. The team identified characteristics of the school, teachers, and administrative staff that could act as catalysts and change agents. Barriers to program development were identified. Understanding the attitudes of teachers toward information skills was a necessary step prior to development of the project planning model. The model was applied to a year 7 science unit, in order to demonstrate the teacher's use of the CPPT approach. The program emphasizes the dynamic role of the teacher-librarian as a teaching partner and change agent for educational innovation.

Todd, R. J., And Others. (1992). *The power of information literacy: Unity of education and resources for the 21st century.* Paper presented at the Annual Meeting of the International Association of School Librarianship (21st, Belfast, Northern Ireland, United Kingdom, July 19-24, 1992). (ED 354 916)

Information literacy is the ability to use information purposefully and effectively. It is a holistic, interactive learning process encompassing the skills-based phases of defining, locating, selecting, organizing, presenting, and evaluating information from sources that include books and other media, experiences, and people; being able to consider information in light of knowledge; adding information to current knowledge; and applying this knowledge to solve information needs. An approach for promoting information literacy and establishing an integrated information skills program in a school is described. At Marist Sisters' College, a secondary school in Sydney (Australia), an action research project has attempted to place information literacy at the center of the curriculum. Using R. G. Havelock's model of the change agent, a range of change agent activities has been used. Qualitative evaluation through interviews with 8 teachers and 110 students in grades 7, 9, and 11 has demonstrated the positive impacts of the approach on student self-concept, the learning process, the view of information, learning outcomes, and the learning environment. Three appendixes contain a summary of the information process, change agent activities, and a diagram of the planning model.

Utah State Office of Education. (1991). *Elementary and secondary core curriculum standards. Levels K-12.* Library Media. 48 p. (ED 371 720).

The Utah State Board of Education established a policy requiring the identification of specific core curriculum standards that must be completed by all kindergarten through grade 12 students as a requisite for graduation. The core curriculum consequently represents standards of learning that are essential for all students. This document presents the core curriculum standards for the state's library-media program. The library-media-skills core curriculum is based on four essential activities: (1) identifying and locating information and resources; (2) selecting and using information and resources; (3) evaluating information and resources; and (4) appreciating and evaluating children's literature. Core standards are identified for each grade level. Specific objectives are listed for kindergarten through grade 6. Beginning with grade 7, library media skills are infused into the language-arts core curriculum and will be infused into other curriculum areas as the supporting documents are revised. Standards for grades 7 through 12 that relate to library-media skills are listed, along with objectives for each standard, which are to be implemented in a series of projects and papers students will write.

Vandergrift, K. E. (1994). *Power teaching: A primary role of the school library media specialist. School library media programs: Focus on trends and issues No. 14*, 171 p. Chicago: American Library Association. (ED 369 419). Document Not Available from EDRS.

This book illustrates the roles of the school library media specialist as instructional consultant and teacher as well as information specialist and frames these roles in a background of relevant educational concerns. Chapter 1 surveys current efforts to restructure the education system and stresses the importance of the school library media specialist in promoting the use of multiple technologies for educational reform. Chapters 2 and 3 present a variety of teaching models and explain how a school library media specialist may work with classroom teachers to present a range of different learning opportunities for particular subjects made possible by library resources. In this connection, semantic webbing is also discussed, as well as issue- and materials-centered research. Chapter 4 discusses critical thinking and focuses on the necessity of teaching critical evaluation of information to children of all ages. Chapter 5 elaborates on webbing, discussing pre-webs, literary webs, and complete webs. Chapter 6 discusses informal library staff development and includes teaching content for workshops on a variety of topics and for different grade levels. Chapter 7 overviews media center evaluation and presents two evaluative instruments. The first emphasizes time allocation and priorities in general library activities. The second includes a set of paired questionnaires to encourage school and public libraries to study their working relationships together.

Wesson, C. L. (Ed.) & Keefe, M.J. (Ed.). (1995). *Serving special needs students in the school library media center. Greenwood professional guides in school librarianship.* CT: Greenwood Press, 269 p. (ED 385 999)

This collection of papers considers how the school library media specialist serves special needs students and classroom teachers in multiple roles as teacher, information specialist, and instructional consultant or collaborator. Included are the following papers: "Teaching Library and Information Skills to Special Needs Students" (Caren L. Wesson and Margaret J. Keefe); "Assessing Library and Information Skills of Special Needs Students" (Margaret J. Keefe and Caren L. Wesson); "Fostering an Appreciation of Literature in Special Needs Students" (Margaret J. Keefe and Caren L. Wesson); "Vocational Instruction in the Library Media Center" (Deborah Jilbert); "Selection of Materials for Special Needs Students" (Lula Pride and Lois Schultz); "The School LibraryMedia Specialist's Role in Bibliotherapy" (Robert P. King); "Accessibility of School Library Materials for Special Needs Students" (William J. Murray); "Instructional Technology and Students with Special Needs in the School Library Media Center" (Ann Higgins Hains and Dave L. Edyburn); "An Active Role for School Library Media Specialists in the Identification and Placement Procedures for Special Needs Students"

(Deborah L. Voltz); "School Library Media Specialists as Partners with Classroom Teachers in Generalizing the Skills of Students with Special Needs" (M. Lewis Putnam); "Fostering Relationships among Special and General Education Students in the School Library Media Center" (Caren L. Wesson and others); "The Special Needs of Gifted and Talented Students in the School Library Media Center" (Caren L. Wesson and Margaret J. Keefe); "Libraries as Laboratories for Learning: Integrating Content, Learner's Needs, and Experience into the Curriculum" (Amy Otis-Wilborn and Terry McGreehin); and "School Library Media Specialists and Professional Development" (Caren L. Wesson). A 35-item annotated bibliography is also provided.

Wisconsin Educational Media Association. (1993). *Information literacy: A position paper on information problem-solving.* 6 p. Appleton, WI: Author. (ED 376 817).

Key elements of information literacy are identified, and a rationale is presented for the integration of information literacy in all aspects of the kindergarten through grade 12 and postsecondary curricula. Many aspects of the school restructuring movement and library media programs relate directly to information literacy and its impact on student learning. The basic elements in an information literacy curriculum are: (1) defining the need for information; (2) initiating the search strategy; (3) locating the resources; (4) assessing and comprehending the information; (5) interpreting the information; (6) communicating the information; and (7) evaluating the product and the process. Three scenes illustrate students demonstrating information literacy problem solving skills.

Yaacob, R. A. & Seman, N.A. (1993). Towards achieving a critical thinking society in Malaysia: A challenge to school libraries and educational systems. In: *Dreams and Dynamics.* Selected papers from the Annual Conference of the International Association of School Librarianship (22nd, Adelaide, South Australia, Australia, September 27-30, 1993. 15 p. (ED 399 933)

One of the challenges facing Malaysia amidst its economic development is the achievement of a critical thinking society. This would enhance and guarantee the success of research and development programs in addition to having other socioeconomic effects. This paper covers the following topics: Vision 2020, Malaysia's goal to reach developed nation status by the year 2020; Malaysia's educational system; the role of the government/educational system, school libraries, teachers and schools, public libraries, parents, and schools of library and information science; methods of achieving a critical thinking society; information literacy and systematic information skills; characteristics of a critical thinker; and recommendations for the educational system, information skills program, curriculum, and research. Two appendices consist of considerations for critical thinking skills for school and classroom management, and a diagram of issues related to the implementation of the information skills program.

ERIC Journal Articles (Higher Education)

Atton, C. (1994). Using critical thinking as a basis for library user education. *Journal of Academic Librarianship, (20)*5-6, 310-313. (EJ 497 986)

Critical thinking exercises incorporated into an undergraduate course of bibliographic instruction encourage students to analyze and evaluate information and retrieval methods, thus enabling them to become more effective information users.

Baldwin, G. D. (1994). Designing computer mediated communication into the classroom: The virtual social science laboratory project. *ED-Education at a Distance, (8)*1, J5-J12. (EJ 503 446)

Evaluates the use of computer-mediated communication in a sociology course at Henderson State University (Arkansas). Highlights include information literacy and liberal arts education; critical thinking; computer conferencing on campus networks; online teaching methods and evaluation; student characteristics; electronic mail; privacy and freedom of expression; and future possibilities.

Behrens, S.J. (1994). A conceptual analysis and historical overview of information literacy. *College and Research Libraries, (55)*4, 309-322. (EJ 486 800)

Analyzes definitions of information literacy by reviewing library and information science literature of the 1970s and 1980s. The response of the information profession to the expanding range of skills and knowledge required for information literacy is noted. Three main trends in information literacy from the literature of the early 1990s are identified.

Benson, L. D. (1995). Scholarly research and reference service in the automated environment. *Reference Librarian, (48)*, 57-69. (EJ 508 684)

Discusses the challenges and opportunities facing social science academic reference librarians working with researchers in a rapidly changing technological environment. Highlights include faculty relations and training needs; assistance to graduate students, such as suggestions for bibliographic instruction; information products and user expectations; and problems with information overload.

Bruce, C. S. (1995). Information literacy: A framework for higher education. *Australian Library Journal, (44)*3, 158-170. (EJ 518 344)

Discusses information literacy and presents a theoretical framework for higher education. Highlights include characteristics of an information literate person, including independent self-directed learning and the use of information technology; information literacy education strategies in the academic curriculum; evaluating information literacy education; university administration; staff development; and information services.

Cooper, T., & Burchfield, J. (1995). Information literacy for college and university staff. *Research Strategies, (13)*2, 94-106. (EJ 507 071)

Explores the advantages and difficulties of offering information literacy programs to academic staff who work outside the classroom, and the feasibility of integrating sessions into the workplace. Topics include the library's role, the institution's role, exploring user needs, and suggestions for promoting staff information literacy.

Daragan, P., & Stevens, G. (1996). Developing lifelong learners: An integrative and developmental approach to information literacy. *Research Strategies, (14)*2, 68-81. (EJ 528 069)

Describes the first component of a four-year, course-integrated library instruction program based on William Perry's developmental model, which was developed at the U.S. Coast Guard Academy. Results of evaluations comparing pre- and posttest scores show increased student levels of information literacy. An appendix presents a year-by-year outline of program goals.

George, R., & Luke, R. (1996). The critical place of information literacy in the trend towards flexible delivery in higher education contexts. *Australian Academic & Research Libraries, (27)*3, 204-212. (EJ 532 952)

Higher education is responding to the various learning needs of students through the flexible delivery approach which focuses on student-centered activities, multiple resources, and lifelong learning. Technology and information literacy enable students to deal with information independently, so they are pivotal for flexible delivery. The role of academic libraries in enhancing student skills is also discussed.

Hawes, D. K. (1994). Information literacy and the business schools. *Journal of Education for Business, (70)*1, 54-61. (EJ 490 532)

Examines information, the information society, information overload, and information literacy and establishes a rationale for why universities--particularly business schools--should be teaching the skills that form the foundation of an information literate person. Concludes that business schools are not doing enough, perhaps because of the lack of attention to this issue by accrediting agencies.

Kester, D. D. (1994). Secondary school library and information skills: Are they transferred from high school to college? *Reference Librarian, (44)*, 9-17. (EJ 488 269)

Discussion of secondary school library and information skills focuses on a study at East Carolina University that was conducted to determine what library skills first-year college students had. Highlights include instruction on library usage in high school; actual library usage; and identification of standard reference terms.

Klavano, A. M.; Kulleseid, E. R. (1995). Bibliographic instruction: Renewal and transformation in one academic library. *Reference Librarian*, 51-52, 359-83. (EJ 518 320)

Examines the impact of institutional evaluation on Mercy College (New York) library's bibliographic instruction program and its evolution into an information literacy program responsive to changes in student demographics, curriculum content, assessment methods, and communication technologies. Topics include course-integrated instruction, information literacy assessment, peer tutors, and future directions.

Leckie, G. J. (1996). Desperately seeking citations: Uncovering faculty assumptions about the undergraduate research process. *Journal of Academic Librarianship, (22)*3, 201-208. (EJ 526 298)

Faculty often overestimate the scholarly communication experiences, critical thinking abilities, and information seeking skills of the undergraduates to whom they assign papers. A stratified methodology is suggested for teaching information retrieval skills in the classroom. A strong curriculum-integrated approach could ease the burden on students and academic librarians.

Milne, P. A. (1996). Generic skills, group work and the world wide web: Ingredients for a creative teaching and learning experience. *Education for Library and Information Services: Australia, (13)*3, 21-36. (EJ 536 205)

To teach generic skills, including communication, information literacy, problem solving, teamwork, professionalism, and lifelong learning, University of Canberra's (Australia) Library and Information Science Program developed Network Information Sources (NIS), a group-based project using technology as the content and facilitator of study. NIS consists of World Wide Web learning modules, home page creation, and group work assessment. Evaluates NIS's outcomes and acceptance.

Orr, D., and Others. (1996). Teaching information literacy skills to remote students through an interactive workshop. *Research Strategies, (14)*4, 224-233. (EJ 538 032)

A program was designed at the Central Queensland University (Australia) Library to teach on- and off-campus students how to access and explore databases, to encourage skill development through learning exercises, and to facilitate peer interaction and discussion of search strategies and techniques. Student evaluation indicated that the program offered distinct benefits.

Otero-Boisvert, M. (1993). The role of the collection development librarian in the 90's and beyond. *Journal of Library Administration, (18)*3-4, 159-170. (EJ 476 169)

Explores the changing role of the collection development librarian in relation to the issues of budgetary constraints and the impact of electronic technology on academic research. The characteristics, skills, and knowledge required on the job are defined, and different approaches to acquiring them are offered.

Page, M.; Kesselman, M. (1994). Teaching the internet: Challenges and opportunities. *Research Strategies, (12)*3, 157-167. (EJ 493 295)

Describes distinctions between networked and traditional information resources, explains how these affect user education, and discusses how to transform traditional library instruction into meaningful network education. The nature of the Internet, the librarian's role, staff training, user instruction, using the network to teach, and opportunities for collaboration are covered.

Pennycook, A. (1996). Borrowing others' words: Text, ownership, memory, and plagiarism. *TESOL Quarterly, (30)*2, 201-230. (EJ 529 487)

Considers some of the complexities of text, ownership, memorization, and plagiarism. The article suggests that plagiarism needs to be understood in terms of complex relationships between text, memory, and learning as part of an undertaking to explore different relationships between learning, literacy, and cultural difference.

Rader, H. B. (1995). Information literacy and the undergraduate curriculum. *Library Trends, (44)*2, 270-278. (EJ 513 796)

Discusses the integration of information and technological skills into the undergraduate curriculum. Topics include information literacy; the role of the academic library in higher education reform; information literacycriteria for undergraduates; and examples of successful curriculum integration programs at Earlham College, the University of Wisconsin-Parkside, and Cleveland State University.

Rader, H. B. (1994). Library orientation and instruction—1992. *RSR: Reference Services Review, (22)*2, 79-95. (EJ 486 753)

This annotated list of materials dealing with information literacy includes publications on user instruction in academic libraries (140 titles), public libraries (4 titles), school libraries (56 titles), and special libraries (11 titles) and for all levels of users (6 titles). Statistics regarding the numbers of publications are discussed.

Ruess, D. E. (1994). Library and information literacy: A core curriculum component. *Research Strategies, (12)*1, 18-23. (EJ 483 735)

Reviews the literature on library and information literacy and describes the development of an undergraduate core course on library and information skills at the University of

Alaska, Fairbanks. The bibliographic instruction component is explained, and assessment of the course after the first year is discussed.

Sonntag, G., & Ohr, D. M. (1996). The development of a lower division, general education, course integrated information literacy program. *College & Research Libraries, (57)*4, 331-338. (EJ 537 864)

Presents a model for a course on information literacy that was developed by librarians at California State University at San Marcos. Topics include the role of the library in higher education reform; active learning activities; convincing faculty and administrators of the need for information literacy courses; and future implementation.

Tiefel, V. (1993). The gateway to information: The future of information access . . . today. *Library Hi-Tech, (11)*4, 57-65,74. (EJ 476 240)

Describes a microcomputer program that serves as a front-end to an online library catalog and other information sources and provides guidance to students on searching for and evaluating information. Funding, technology, evaluation, impact on other libraries, and future plans are discussed. Sample screens are included.

Tompkins, P. (1996). Quality in community college libraries. *Library Trends, (44)*3, 506-525. (EJ 520 152)

Examines indicators of quality in academic and research libraries, especially community college libraries. Topics include standards of the Association of College and Research Libraries; standards of the business community, including Total Quality Management; quality management as systemic change; impediments to quality; and information literacy.

Wilson, V. (1994). Developing the adult independent learner: Information literacy and the remote external student. *Distance Education, (15)*2, 254-278. (EJ 501 725)

Analyzes current opinion on the development of information literacy skills among adult higher education students. Highlights include lifelong learning; information literacy and the role of the academic librarian; adult learning theory; defining information skills; and information literacy and the external student, including continuing education, open learning, and distance education.

Wilson, V. (1994). Information literacy and remote external students: Exploring the possibilities offered by new communications technologies. *Australian Academic and Research Libraries, (25)*4, 247-252. (EJ 499 899)

A study was conducted at Edith Cowan University on providing information literacy education to remote students through communication technology. Highlights include

educational theory, information literacy, and the role of the library; attitudes to external study and library use; attitudes and access to technology; confidence levels in information seeking tasks; and future directions.

ERIC Documents (Higher Education)

American Library Association. (1995). *Information for a new age: Redefining the librarian.* A Library Instruction Round Table (LIRT) 15th anniversary publication. Compiled by the Fifteenth Anniversary Task Force. Chicago: Author. (ED 379 006) Document Not Available from EDRS.

Bibliographic Instruction (BI), which focuses on the need to make library patrons become more proficient in locating and using information, is a major contributor to information literacy. The 14 papers and essays in this volume describe approaches to proactive interaction with library users with the single goal of achieving an information literate society. The titles include: "Information for a New Age: Fantastic Technology or Institutionalized Alienation?" (Robert Silverberg); "Librarians or Technicians? Which Shall We Be?" (Deanna B. Marcum); "The Death of the Librarian in the (Post) Modern Electronic Information Age" (Robert K. Kieft); "Bibliographic Instruction, Briefly" (Evan Ira Farber); "Information Literacy and Public Libraries: A Community-Based Approach" (Susan Jackson); "The Instructional Role of the Library Media Specialist in the Information-Age School" (Carol C. Kuhlthau); "Education for the Academic Library User in the Year 2000" (Virginia Tiefel); "Library Instruction for Special Libraries: Present and Future" (Mignon Strickland Adams); "Information Literacy" (American Library Association); "Avoiding the Cereal Syndrome; or, Critical Thinking in the Electronic Environment" (Cerise Oberman); "Building Coalitions for Information Literacy" (Abigail Loomis); "Conversation 101: Process, Development, and Collaboration" (Janice A. Sauer); "Expanding the Evaluation Role in the Critical-Thinking Curriculum" (Daniel Callison); and "BI and the Twenty-First Century: An Opinion" (Leigh A. Kilman). A 31-item annotated bibliography is organized around the following themes: technology, libraries, and the future; technology and information literacy; technology and remote users; and the human-machine interface (social and psychological factors). A list of Library Instruction Round Table (LIRT) 15th Anniversary Task Force members and an index are also provided.

Baker, B., & Litzinger, M. E. (Eds.). (1992). *The evolving educational mission of the library.* Association of Coll. and Research Libraries, Chicago, IL. Bibliographic Instruction Section. 202 p. (ED 365 347)

At the 1989 annual meeting of the American Library Association (ALA), the Association of College and Research Libraries (ACRL) used a think tank as a dynamic mechanism for exploring future directions both in the discipline of library user education and for the Bibliographic Instruction (BI) Section of ACRL. Discussion centered on the following issues: primary user groups and how have they changed during the past decade; how the curricular reform movement affects the content of bibliographic instruction programs; the appropriateness of information literacy as a phrase to characterize BI librarians' instructional programs for the upcoming decade; and how professional education programs in library and information science can respond to changes. The four discussion issues suggested necessary change or transition, particularly for BI, but more broadly affecting reference and public service, library missions and goals, and the educational focus of the library and information science profession. The eight papers included in the collection are: (1) "Bridging the Gap between the Think Tanks" (Donald Kenney); (2) "The Think Tank Papers: Are We in the Ball Park?" (Elizabeth Frick); (3) "Changing Users: Bibliographic Instruction for Whom?" (Lizabeth A. Wilson); (4) "The Changing User and the Future of Bibliographic Instruction: A Perspective from the Health Sciences Library" (James Shedlock); (5) "Curriculum Reform: The Role of Academic Libraries" (Maureen Pastine and Linda Wilson); (6) "Information Literacy: One Response to the New Decade" (Hannelore Rader and William Coons); (7) "Education for the Second Generation of Bibliographic Instruction Librarians" (Martha L. Hale); and (8) "The Future of Bibliographic Instruction and Information Literacy for the Academic Librarian" (William Miller). "Educational Roles of Academic Libraries: State of the Art and an Agenda for the Future" (Randall Hensley and Beth Sandore), a summary document from the conference, is appended.

Beaudoin, M.; And Others. (1993). *Position paper on learning resource centres and their future in the Ontario Community College System: A technology perspective.* Georgian Coll. of Applied Arts and Tech., Barrie (Ontario). 21 p. (ED 374 801)

The Learning Resource Centres (LRCs) of Ontario (Canada) are in the midst of a technological metamorphosis unprecedented in their 25-year history. The LRCs are becoming centers for independent, self-paced, experiential learning, places in which students actively create, evaluate, experience, and interpret a world of information through technology. LRCs in Ontario are being influenced by national, provincial, and local trends. As they adopt a broader vision of the future, they plan for important roles in: (1) information literacy; (2) alternative learning; (3) software; (4) production; (5) instructional telecommunications; (6) distance education; (7) curriculum design and delivery; and (8) classroom design. Few of the Ontario LRCs are structurally, financially, or technologically prepared for their new and expanded roles. A transformed role for the LRCs implies significant change in alternative learning, information literacy, leadership, access, standards, staff training, and funding.

Booker, D., (Ed.). (1992). *Information literacy: The Australian agenda.* Proceedings of a conference conducted by the University of South Australia Library (Adelaide, South Australia, Australia, December 2-4, 1992). University of South Australia, Underdale. 193 p. (ED 365 336)

The aims of this conference were to promote information literacy as a means of personal and national advancement in today's information-dependent society; to emphasize information literacy as an essential competency for lifelong learning; to ensure that all delegates understand information literacy and its importance for the economic and social well being of their community; to develop cross sectoral cooperation in promoting information literacy; to establish a broad-based national coalition for information literacy; and to identify the agenda for change needed across education and information sectors to raise the level of information literacy. The following papers are included: (1) "Information Literacy: What's It All About" (Patricia Senn Breivik); (2) "Information Literacy: Why Worry?" (Rodney Cavalier); (3) "What's the Government Saying?" (Anne Hazell); (4) "The Learning Society" (Philip Candy); (5) "Establishing the Agenda for Change" (Richard Owen); and (6) "What Can We Learn from the US Experience?" (Patricia Senn Breivik). Also included are the proceedings of 16 workshops and 76 recommendations from the workshops which provide the agenda for action on issues relating to information literacy in Australia. These recommendations address social justice, staff development, preservice training, research, partnerships and networks, economic development, advocacy, curriculum/methodology change, and supporting informal learning. Most of the papers contain references.

Brown, L. S. (1996). *Development, implementation, and evaluation of an information literacy program for the Undergraduate School at Philadelphia College of Bible.* Ed.D. Practicum Applied Research Project, Nova Southeastern University. 130 p. (ED 402 933)

One of the requirements for students majoring in Bible in the undergraduate school of Philadelphia College of Bible (Pennsylvania) is writing research papers. The papers are designed to promote information literacy by developing research skills, sharpening writing skills, encouraging critical thinking, and promoting problem-solving skills. However, students are not adequately prepared to write their research papers--the first year English Composition course spends only limited time on research strategies and the utilization of specific tools in the library, and students lack critical thinking skills. This study details the creation of a curriculum-wide information literacy program. A literature review enabled the development of a library committee questionnaire, academic affairs committee proposal, revised student writing guide, information literacy program booklet, and faculty workshop presentation. The study investigated: (1) how other institutions of higher education are meeting students' information literacy needs; (2) how faculty members should be prepared to participate in the program; (3) how students will complete research papers while participating in the program; and (4) how the information literacy program should be implemented and evaluated. Appendices include the questionnaire, responses, proposal to the academic affairs committee, revised student writing guide, information literacy program booklet, faculty workshop outline, and information literacy evaluation packet.

Brown, L. S., & Ryan, G. J. (1994). *Development of an information literacy program for the Degree Completion Program at Philadelphia College of Bible.* Ed.D. Practicum, Nova Southeastern University. 126 p. (ED 402 932)

One of the major requirements in the degree completion program at Philadelphia College of Bible (Pennsylvania) is the completion of a major research paper. The paper is designed to develop research skills, sharpen writing skills, encourage critical thinking, and promote problem-solving skills. Students were not adequately prepared by either the writing guide or the curriculum to write their major research paper. The writing guide was too long and complicated, and the curriculum modules were not designed to encourage research skills nor complement the writing assignment. This study describes the creation of an information literacy program for the degree completion program. The degree completion program provides an opportunity for full-time working individuals to graduate with a baccalaureate degree after 22 months of study. Three faculty and student guides were written or revised to provide direction for the information literacy program. The faculty guide was written to provide faculty with definitions, guidelines, and instructions for teaching the information literacy program. The student guide was revised to include a section on basic research skills and instruction on how to write the research paper required for graduation. The library research guide was revised to coordinate the instruction of the faculty guide with the research skills necessary for completion of the student project. Appendices include the student and faculty guides, and library research handbook.

Brown, L. S., & Ryan, G. J. (1995). *The relationship of time to effectiveness in research skills instruction for students at Philadelphia College of Bible.* Ed.D. Practicum, Nova Southeastern University. 164 p. (ED 402 931)

One of the many requirements for students majoring in Bible in the undergraduate program at Philadelphia College of Bible (Pennsylvania) is writing papers. The papers are designed to develop research skills, sharpen writing skills, encourage critical thinking, and promote problem-solving skills. However, students are not adequately prepared to write their papers. The first year English Composition course attempts to develop research skills but spends only limited time on research strategy. The director of the Learning Resource Center is given one hour to present a session on research strategies and give a brief library tour. This study compares the results of teaching three hours of research skills with the results of teaching one hour of research skills. Four sections of first year English Composition students were given a pre-test to gauge their research skills. Two sections received one hour of library instruction, and two sections received three hours of library instruction. A post-test was administered to all students. No significant difference was found in the post-test results between students who received one hour of library instruction and students who received three hours of instruction. Possible reasons for the findings are discussed. Appendices include the pre and post test, one and three hour curriculums, one and three hour worksheets, and test scores.

Burnheim, R. (1991). *Curriculum influences on reader education in the TAFE environment.* 12 p. (ED 356 771)

This paper describes competency-based training and open learning, two methods of teaching/learning that are having a significant effect on the education offered through Australia's Technical and Further Education (TAFE) program. The paper defines competency based training and open learning and details the broad impact they are having on resource services delivered through the TAFE college library. Two approaches to providing learners with research process skills that will harmonize with these teaching/learning methods are described. They include developing a team approach to research and developing thinking skills in concert with the processing of information. The last section of the paper describes how the TAFE libraries can promote their role in the development of informed information users.

Burnheim, R. (1993). *Information literacy: The TAFE scene.* Technical and Further Education-TEQ, Queensland (Australia). Library Network Branch. 11 p. (ED 368 377)

The concept of information literacy is explored and the major issues to be developed in its pursuit of technical and further education (TAFE) in Australia are considered. Information literate people are those who have learned how to learn because they know how knowledge is organized, how to find it, and how to use it so that others can learn from them. Australia faces strong competition to remain a viable competitor in the international market. The new types of education and education delivery systems that are developing are essential to the nation's preparedness in the age of information literacy. Research has identified competencies that are required for the information literate. Library activities conducted by TAFE college libraries in Australia are summarized. A major accomplishment is the development of teaching modules in the area of information literacy. Pilot versions have been forwarded to all TAFE libraries in Queensland for testing and evaluation.

Burnheim, R. K. (1993). *The questions that they ask.* 19 p. (ED 368 379)

This paper discusses the competencies that are required to work effectively with information. It examines the nature of the information resources and how students interact with them. The discussion moves to the types of questions students have asked and suggests that the predominant types may not be assisting students in developing information usage skills, thus not improving their mastery of a skill set such as that proposed by R. J. Marzano and R. W. Ewy (1989). Reviews of research have indicated that teachers often do not ask questions that require students to work with information resources, relying instead on questions that merely ask for the recall of knowledge. The challenge is for teachers to more frequently pose questions that encourage students to use the problem-solving approaches they will need in the world of the future. The rapid redundancy of information means that no institution can give its students all the knowledge they will need, but students can be given the skills to update and refine their knowledge. Two figures illustrate the discussion.

Carstarphen, M. G. (1995). *New media literacy: From classroom to community.* Paper presented at the Annual Meeting of the Conference on College Composition and Communication (46th, Washington, DC, March 23-25, 1995). 12 p. (ED 387 842)

Each new media revolution forces adjustments for both the producers of messages and the receivers of those messages. Integral to the communication process is an understanding of what it means to be literate in an eclectic communication environment and of how the new media may enhance or impede literacy. An important premise for this discussion is that here must be a correlation between two concepts: what it means to be "media literate" (savvy to the processes and protocol of the media) and what it means to be "literate through media" (using the media as conduits to achieve heightened proficiencies in the basic literacy skills of reading, writing and comprehension). "Surfing" one of the incarnations of the new media, the Internet, a researcher asked six respondents questions about literacy and computers. The respondents were two university administrators, two media managers/publishers, a corporate librarian, and an independent writer/teacher. Responses, thought not scientifically solicited, were revealing, and, in may ways, closely reiterated the Electronic Frontier Foundation's co-founder John Barlow's vision of the transformation of information from product to process. Questions ranged from what media the respondents had encountered through their jobs to how they would define literacy and whether they thought it was in need of redefinition in light of the new media. Most significant results showed that the respondents believed that media and literacy, whether old or new, all involve one thing: the transmittal of information. This transmittal calls for basic skills like the ability to read and write and think critically.

The EDUTECH Report. The education technology newsletter for faculty and administrators. *EDUTECH Report, (9)*1-12 (Apr 1993-Mar 1994). 97 p. (ED 387 127)

This newsletter examines education technology issues of concern to school faculty and administrators. Regular features in each issue include educational technology news, a book review, and a question and answer column. The cover articles during this volume year are: "The Build or Buy Decision: No One Right Answer"; "The National Information Infrastructure" (Bernard W. Gleason); "Information Literacy: Liberal Education for the Information Age" (Patricia Senn Breivik and Dan L. Jones); "The Role of the CIO in the Curriculum Change Process" (John Swearingen); "Seven Basic Principles of Dealing With Vendors"; "Hot Issues 1993-94"; "The Many Layers of Reengineering"; "How to Do A Help Desk Right"; "Do Computers Help Students Learn?" (G. Phillip Cartright); "The One Right Answer for Higher Education"; "Focus on the Foundation: Decision Support Will Happen"; and "Campuses Need Not Wait to Enter Cyberspace" (John V. Lombardi).

Fridie, S. (1994). *Information seeking behavior and user education in academic libraries: Research, theory, and practice.* A selected list of information sources. 88 p. (ED 371 766)

This document lists sources useful for academic reference and instruction librarians who are concerned with assisting and teaching novice or non-professional end-user searchers. The bibliography is organized in two lists: complete bibliographic citations and subject listing of references. The types of sources listed include journal articles, books, conference roceedings, doctoral dissertations, and ERIC documents. The subject listing of references is organized into four parts. Part I, "Information Seeking Behavior," covers information needs; the research process; the search process; and retrieval performance. Part II, "Psychological Aspects of Information Seeking Behavior," includes psychological theories and research methods; affective factors and anxiety; cognitive factors; user needs and user studies; user-intermediary interaction; human computer interaction; and individual differences and searching styles. Part III, "Characteristics of Searchers," covers academic background and knowledge of subject; searching experience; level of education of searchers; and other characteristics. Finally, Part IV, "User Education for Information Seeking and Retrieving," includes implications of information technology for user education and reference service; the role of academic librarians; information literacy; critical thinking; learning theories and learning styles; cognitive models and mental models; and instructional objectives, teaching methods, and user education program descriptions.

Information literacy: Lifelong learning in the middle states region. A summary of two symposia (Philadelphia, Pennsylvania, March 27, 1995) and (Rochester, New York, May 1, 1995). Commission on Higher Education, Philadelphia, PA. Middle States Association of Colleges and Schools. (1995). 28 p. (ED 386 157)

This report provides a summary of two symposia on information literacy sponsored by the Commission on Higher Education, Middle States Association of Colleges and Schools (CHE), the National Forum on Information Literacy, and the Association of College and Research Libraries. These events brought together institutions of the Middle States region who have made progress toward institutionalizing information literacy so that they could share their expertise and enhance their varied approaches to information literacy initiatives. The need is noted for campus-wide commitment to information literacy as an educational strategy that will improve learning experiences. Several approaches that can help establish commitment and then translate it into reality are discussed: demonstrating the importance of information literacy; ensuring a shared vision among administrators; facilitating professional development; restructuring curricula to emphasize information literacy; adapting to student needs; and collaborating with K-12 and graduate programs. A list of symposia participants is provided.

Koltay, Z. (1996). *Supporting digital instructional technology: The role of the academic library.* 18 p. (ED 403 914)

Academic libraries must reevaluate their instructional technology services in order to fulfill their mission of supporting the teaching activities of their parent institution in the current state of technological development. Applying modern approaches to further traditional library goals and making use of the expertise librarians gain while building and supporting electronic libraries can position the library at the center of an active instructional technology program that benefits the whole campus community. Librarians possess many skills--expertise with organizing information; teaching information literacy; creating and maintaining electronic libraries; concern for effective, easy, and equitable access; knowledge of user behavior; and relationship with faculty--that argue for their involvement with instructional technology support. Students benefit from richness added to the learning experience, and gain information skills that will help them both during and after their university careers. Instructors benefit because instructional technology can make their teaching more effective and more efficient. Librarians gain updated services, more visibility, close working relationship with faculty, and an expanded electronic library that includes course materials in support of the university's instructional activities.

Library faculty in California Community College Libraries: Qualifications, roles, & responsibilities. (1996). California Community Colleges, Sacramento. Academic Senate. 11 p. (ED 395 630)

This report presents background information on library issues in California Community Colleges (CCC); identifies the relationship between the mission of the colleges and the Library Science discipline; and describes the qualifications, roles, and responsibilities of library faculty. Following a brief introduction, the first section of the report discusses the instructional role of library faculty as the primary teachers of research methods, critical thinking skills, and information literacy skills. This section also indicates that library faculty are at the forefront of the information revolution, developing innovative ways of obtaining, delivering, and facilitating the use of information. The next section describes the role of community college library faculty in curricular development, indicating that they must respond to advances in computer technology, the expanded development of communications technologies, and changes in the college student body and financial base. The following section examines their role in college governance through participation in academic senates and curriculum, professional standards, shared governance, budget, planning, hiring, evaluation, tenure, technology, and other committees. The final section describes the qualifications for employment in the CCC as a Masters degree in Library Science and lists the expertise sought in library faculty candidates.

McKenna, M. (1994). *Libraries and the internet.* ERIC Digest. Syracuse, NY. ERIC Clearinghouse on Information & Technology. 4 p. (ED 377 880)

The Internet is an international computer network encompassing thousands of smaller interconnected networks. This digest describes various uses of the Internet and its impact on libraries, as well as Internet related library issues. The Internet applications of electronic mail (E-mail), telnet, and file transfer protocol (FTP) are briefly described. The impact of the Internet on libraries includes: leadership opportunities; cost and time savings; question answering services; international interlibrary loans; document delivery services; online transactions; government information; information sharing; and increased librarian visibility and value to the community. Internet-related issues are discussed with respect to academic, public, special, and school libraries. It is recommended that librarians take an active role in the formulation of national policy and legislation, creation and organization of services and resources, and be properly trained in network literacy in order to provide programs for patrons to become network literate.

Olen, S. (1995). *A transformation in teacher education: Or how can disadvantaged teachers become information literate? Literacy: Traditional, cultural, technological.* Selected Papers from the Annual Conference of the International Association of School Librarianship (23rd, Pittsburgh, Pennsylvania, July 17-22, 1994); see IR 056 058. 7 p. (ED 399 948)

In a developing country such as South Africa, many teachers enter initial teacher education with little or no experience of libraries and information sources. These students need to become information literate during their initial teacher education, otherwise they will not have the knowledge of information sources and skills which they will need if they are going to be role models for their pupils and help them to become information literate. The paper describes a project to improve the media and information skills of under-qualified teachers through in-service workshops. The process could also be used as a model for initial teacher education with students from disadvantaged or more privileged backgrounds. It is important for pupils to become information literate, but before this can happen, their teachers must themselves become information literate. Teaching style influences student learning, and must follow a clearly formulated process, like the one described. This is one way to help transform the prevailing teacher-centered and textbook-centered teaching style to an interactive teaching and learning process based on available information sources.

Perspectives and accomplishments, 1993-1994: Annual report of the executive director. (1995). Commission on Higher Education, Philadelphia, PA., Middle States Association of Colleges and Schools. 20 p. (ED 378 929)

This annual report by the Commission on Higher Education's details progress toward goals and objectives, annual statistics, and key issues in accreditation and quality assurance. A recurring theme of the report and the year it covers is the changing relationship between accrediting agencies and the federal and state governments, specifically in light of the Higher Education Act amendments of 1992. Following an opening message from the executive director, the first section describes executive and professional staff liaison with institutions in a range of campus visits and office meetings related to self-study, evaluation, and the requirements and expectations for applicant and candidate institutions. A section on annual statistics lists institutions receiving candidate status, reaffirmed accreditation, follow-up reports, candidate reports, visits, or other developments. The next four sections discuss information literacy and library support efforts, policy development work, new policy statements on student transfer and articulation, and accreditation of free-standing American institutions abroad. This section also discusses areas for policy work and development in 1994-95. The report includes a description of liaison with external organizations and groups, and workshops, conferences and special events held during 1993-94. A final page lists Commission members and staff.

Ratteray, O. M. T., & Simmons, H. L. (1995). *Information literacy in higher education: A report on the middle states region.* Commission on Higher Education, Philadelphia, Pa. Middle States Association of Colleges and Schools. 10 p. (ED 388 136)

A survey of 830 institutions of higher education in the United States explored the status of initiatives to promote information literacy, which is defined as a subset of critical thinking skills that consists of an individual's knowing when he/she has an informational need and how to access, evaluate, and effectively use information. The survey found that, on a national basis, institutions in the Middle States Association of Colleges and Schools (MSACS) region may be leading other regions of the country in applying information literacy strategies on campus. Of the 259 MSACS respondents, 31 percent indicated that they have a "functional" information literacy program, 27 percent offered a course that focuses on information literacy abilities, and 19 percent integrated information literacy experiences into courses in all majors. The survey also found that 19 percent of MSACS respondents have developed formal assessments of students' information literacy skills, and that 38 percent provided faculty and staff development to support the information literacy program. MSACS institutions were, on average, above the national norms in these areas. Data is provided in six tables.

Sherratt, C. S.; And Others, (1992). *Information services study. Final report.* Massachusetts Institute of Technology, Cambridge, MA. Libraries. 74 p. (ED 366 344)

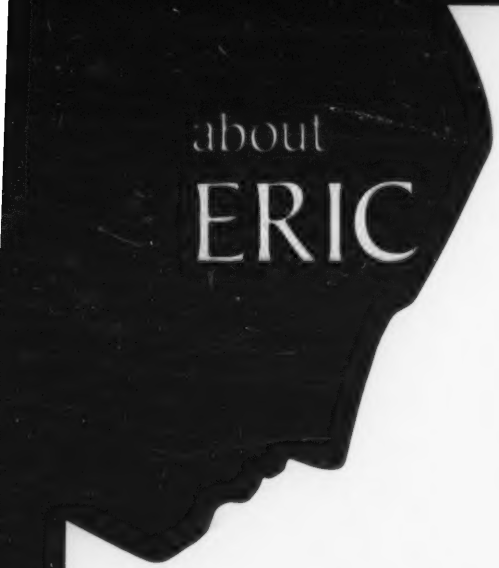
In 1991-1992, the Massachusetts Institute of Technology (MIT) Libraries conducted an Information Services Study with support from the Office of the Provost. Its purpose was to study how faculty, research staff, and students in three disciplines on campus gather information for their work. Members of the departments of Brain and Cognitive Sciences, Management Science in the Sloan School of Management, and Materials Science and Engineering were asked about the information sources they use and their methods of discovering these. The staff assigned to the study were then expected to formulate preliminary recommendations for library and information services based on the findings. This report contains the summary of responses to the questionnaire, themes, recommendations for services, and suggestions for further research. Included in the appendices are the organization of the study; a list of sources, including annotated bibliographies of sources consulted for instrument development and sources for alternative methodologies; areas for question development; data gathering instruments, including "MIT Community Survey of Information Acquisition and Usage," the interview guide, and the focus group discussion guide; and a statistical summary of the questionnaire.

Tompkins, P. (1995). *Information literacy: Real writers, real research.* Paper presented at the Annual Meeting of the Conference on College Composition and Communication (46th, Washington, DC, March 23-25, 1995). 13 p. (ED 388 996)

The decision to organize English 112 courses around a research project entitled "A Survey of the Freshman Composition Requirement at Richmond Area Colleges and Universities" resulted from concerns as the fall of 1993 approached. English 112 emphasizes the study of literature and the production of a research paper that presents an argument by paraphrasing information in books and periodicals. Since the instructor himself has an aversion to writing this type of perfunctory paper, he assumed that his students would have the same aversion. In an article, Richard L. Larson argues that the concept of a research paper has no substantive identity, that is, it is impossible to differentiate between texts that incorporate and evaluate new information and those that do not. In the composition classroom, a research paper is any attempt by writers to gather information for themselves, the world, or others as they make meaning for a purpose. What is the purpose of Freshman English but to prepare students to be self-critically aware as they revise their discourse for a variety of audiences and purposes. With these considerations in mind, a research project was devised that would involve the entire class and serve a real purpose. That project raised important questions such as: (1) what qualifies a researcher as competent? (2) what is the role of students as researchers and writers? and (3) how can educators rethink information literacy so that they can kill the mistaken perception of the so-called research or terminal paper?

Wiggins, M. E. (1994). *Hands-on instruction in an electronic classroom.* A Final Report to the U.S. Dept. of Education of a Research and Development grant awarded to establish a fully equipped electronic training room and test the effectiveness of hands-on instruction in learning the NOTIS OPAC and SilverPlatter ERIC. Brigham Young Univ., Provo, Utah. 109 p. (ED 369 391)

This document is the final report to the U.S. Department of Education of a research and development grant awarded to establish a fully equipped electronic training room and test the effectiveness of hands-on instruction in learning the NOTIS OPAC (online public access catalog) and the Silver-Platter ERIC database on CD-ROM. The purpose of the study was: (1) to identify common errors and problems experienced by students using computer-based research tools; (2) to develop hands-on training modules for specific computer systems; (3) to create a computer equipped training facility that can serve as a model for other institutions; and (4) to implement the training modules on an experimental basis, evaluate their effectiveness, and further refine them. The study was divided into a NOTIS study and an ERIC study. The NOTIS study found no measurable difference in learning between the hands-on group and the lecture/demonstration group. The ERIC group found that hands-on instruction was slightly more effective than a lecture/demonstration alternative and that student interest is enhanced when taught in an hands-on environment.



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outline the impact of information literacy on K-12 and higher education. Finally, the book provides examples of information literacy in various contexts. An extensive ERIC bibliography is appended.

To date this book is the definitive publication on information literacy.

Information Literacy

Essential Skills for the Information Age

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